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TREATISE

ON

Biliary Concretions:

OR, STONES IN THE

GALL-BLADDER and DUCTS.

BY

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THE
P R E F A C E.

THE subject of the following treatise not having been so generally observed, and attended to in practice, as I think the importance of it deserves and requires, and there being no book, that I know of, written expressly and fully upon it, have been the occasion of my turning my thoughts this way, and endeavouring to put together as full and clear an account of it as I was able, both from the principal facts recorded by all the most considerable authors, whose works have fallen under my notice, and from my own observations and reflections upon it.

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it. The disorder is not to be looked upon as a new one, like some few other diseases, nor to be of no older date than the mention made of it by writers; but has without doubt been coeval with most of the other diseases to which the human body is liable, although no notice has been taken of it, so far as I know, till between two and three centuries ago. The ancients seem to have known nothing at all of these biliary calculi, which perhaps was owing to their little acquaintance with anatomy, or at least to their not being accustomed to open morbid bodies. And yet from what they did know of the inward structure of the body, and of the true state of some internal diseases, and from their careful attention to the minute circumstances of their patients cases, it may the more be wondered at, that they had not discovered these concretions. They were
well

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well acquainted with the urinary calculus, both in the kidneys and in the bladder, and in its descent through the ureters. They knew a good deal about the bile, and knew the ducts that convey it to the duodenum; that these ducts are liable to be obstructed by certain causes, particularly by an inflammation, or a scirrhus, and that the jaundice is a consequence of such obstruction: but had not, so far as appears by their writings, any knowledge of a stoppage in the ducts from biliary concretions, or that any such things were ever found in the gall-bladder, or ever expelled with the fæces; though, at the same time, they by no means seem to have been too nice, to examine all the discharges from their patients. If any one should suppose the reason why these concretions were not discovered by the ancients to be, that the subjects of their

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anatomy were chiefly brutes ; this will not altogether remove the difficulty, because the like appearances are found in the gall-bladder and ducts of some brutes, particularly in the horned cattle. And if they had been taken notice of in the stools, one would think from their apparent composition, they must have been concluded to be formed of inspissated bile, and observed to have some connection with the jaundice ; and therefore would have been mentioned by some of the ancients in treating of that disease. But whatever was the reason of their either not knowing these biliary calculi, or being silent about them, I find no notice of them among authors, till we come to the sixteenth century, or at least near to it. This was a remarkable period for the restoration of learning, after so many ages of obscurity and ignorance, and for reviving the
study

study of the Greek physicians. And not only so, but great improvements also were made about this time, towards laying the proper foundation, and advancing the true knowledge of physic, by a more accurate cultivation of anatomy, particularly in the Italian schools, by Carpus, Fallopius, Vesalius, Eustachius, and others; and (which was perhaps of yet further advantage towards forming right notions of many diseases) by the practice of opening morbid bodies. Hence physicians were enabled, to add to the histories of the cases of particular patients (a method of writing in physic as old as Hippocrates and extremely useful when well executed) an account of the different appearances of the several internal parts from what they make in a sound state. About this time, by the frequent dissections of both sound and morbid

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bodies,

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bodies, for anatomical purposes, and for investigating the true seat and causes of internal diseases, these biliary concretions came to be discovered.

I will not take upon me to say, who first found them out, or what author first mentioned them in his writings; nor is it very material. They are spoken of by Fallopius, Vesalius, and Fernelius, who all lived at the same time. And Benevenius, who lived before any of the others, tells * of a large black calculus, of the size of a chestnut found in the gall-bladder of a woman; and that there were, in the same subject, many stones contained in a pendulous bag formed of the membrane that covers the liver. But Fernelius, who was undoubtedly one of the greatest physicians of the age
in

* De abditis morborum causis, Cap. 94.

in which he lived, is among the first authors that take notice of them as found by dissections ; and is, so far as I know, quite the first who speaks of their being voided by stool, which he had often observed. Quinetiam post diuturnum icterum, oborto alvi profluvio, hujus naturæ innumeros calculos instar pisi aut hordei in plerisque exturbari deprehendimus. He knew them of different sizes, sometimes small enough to pass the duct, and at other times so large as to fill the whole bladder. And from him other authors speak of them, using either exactly or nearly his very words. When Camenicens, not long after, had found biliary calculi in the body of a man who died of a jaundice and dropsy, he writes to Matthiolus,† as to an oracle, to be informed about them ;*

* Patholog. lib. VI. cap. 5.

† Matthiol. Epist. lib. V. p. 184.

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*them; at the same time mentioning a very remarkable stone found in the gall-bladder of George, king of Bohemia, which, he says, was still preserved in his time, and was probably of an older date than the case related by Benivenius. Matthiolus, though by his reply he seems to know * little, if any thing, of them himself, yet, unwilling to appear puzzled by any question, readily undertakes to account for them: but what he says most to the purpose are the facts*
he

* He seems to have been much better acquainted with the gall-stones found in oxen than with those in men. How long the former had been taken notice of before Matthiolus his time, I know not; but he says he had received many from the butchers, which he had applied for the cure of various diseases of the human body. And doubtless they might be, at least, as efficacious as that famous costly drug the *bezoar stone*, which was so long held in esteem by many practitioners, though now, I think, almost universally laid aside as *useless*.

he quotes from Fernelius. And even Fernelius himself, who seems to have known as much about them in the character of a physician, or perhaps more than any man in his time, was not acquainted with any violent symptoms occasioned by them, or any proper signs, by which they might be known in patients; though he says indeed, that they are to be suspected in those, who have laboured under a jaundice for a long time, and to a great degree. Nor, so far as appears, had he thought of any method of helping the discharge of them by art. In short, he writes upon the subject as if he was writing about a discovery that was then in its infancy, and all that he says upon it is contained in a few lines.

I must not here forget Kentmannus, who was contemporary with Fernelius, and

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and was also an original author on the subject of these calculi: he wrote a very small tract on twelve sorts of calculi found in different parts of the body, to which he added plates exhibiting the various figures of them; and among the rest speaks of those of the gall-bladder. The account he gives of them is very short, but he describes their size, shape, and inward texture, better than any other author I have seen of his time, or indeed of the remainder of that or the succeeding century. He was also sensible that great obstructions might arise from them, and many violent symptoms, which, he says, might puzzle the most experienced physicians to account for. This tract was published in the year 1565, about seven years after the death of Fernelius. It is so well written, particularly the short chapter on our subject, that one cannot

help wishing it had been much longer; as also that this author had spent less of his time about fossils, (of which he was very fond, and on that account had an intimate friendship with the famous Gesner) and that he had employed himself more in inquiries concerning the human body, and in writing about diseases. The reason why succeeding writers take more notice of Fernelius, on this subject, than of Kentmannus seems to have been, that the former was a man of so great note, as a physician, and as an author, that his works were in every body's hands; whereas our author wrote but a little, and what he did write was not published by itself, but in Gesner's book, De Omni Rerum Fossilium Genere; which not being a subject of general notice, Kentmannus was perhaps not so much known, though all that he has said on
gall-

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gall-stones is transcribed and quoted by Schenckius in his collection of observations.

From about this time, almost all the succeeding anatomists take notice of these calculi; and the systematic writers in physic speak of them as one cause of the jaundice; but, copying from Fernelius, and from one another, take it for granted that the signs of them are not very evident, and that when that disease proceeds from this cause, it is quite incurable. And perhaps it was because the signs of them were so little known, that Lommius, that excellent writer about diagnostic and prognostic signs, only just mentions them, and almost in the words of Fernelius.

Among the observators also, from the time that they began to open morbid

morbid bodies, and to record the preternatural appearances of the several internal parts, we meet with innumerable instances of these calculi. And from a number of such histories properly related, that is, with a full detail of all the circumstances that attended the cases of the patients, we might have a clue to guide us in searching out the symptoms arising from or connected with the calculi; in like manner as we learn other diseases, which have their seat in the several internal parts. But when we are only told what was found by dissection, without any account of the complaints, or of the condition of the patients during life, either in cases of calculi, or of any other morbid state of the body, we can hardly learn any thing more from such histories, than that the body is liable to be affected in such a manner; and are by no means thereby instructed,

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*ed, how to discover the like disorders, when we meet with patients afflicted with them: as on the other hand, the histories of many kinds of internal diseases, which proved fatal, are deficient, and often of but little use, though well told, when the writer is not able to add an account of the dissection. These calculi were often found in morbid bodies quite unexpectedly, when no such thing was thought of even by those who had attended the patients, their complaints having been imputed to other causes. Many also of the cases we meet with in observators are told very superficially, which are therefore of very little use; and some of them are recorded chiefly as matters of curiosity, a thing which many writers of this class have been too fond of, as well well with regard to calculi, as to many other disorders: so that either
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for these reasons, or through some other fault, among the numberless volumes of observations of particular cases, there are but few which are written with so much care and propriety, as that instructive method of writing requires. And even those histories of calculi, which were more circumstantially and properly related, seem to have been looked upon as curiosities, and not regarded and attended to by succeeding writers, so as to collect and compare them together, in order to apply them to practice, until this present century.

Most of the great physicians of the last century just mention calculi, when speaking of the jaundice, as one cause of that disease. Sennertus, Riverius, Etmullerus, Sylvius de le Boe, Willis, Baglivi, and others, speak of them in this manner. Some

*of them indeed do observe, that when the jaundice is of long standing, and very obstinate, or especially if there have been frequent returns of it, these are signs that it arises from this cause. And this seems to be all that so late a writer as Baglivi knew about the signs of them. He says, perhaps too positively as to the cause, and certainly so as to the incurableness of the disease: Si icteros videas pertinaces, vel sanatos sed recidivantes, pro certo habeas, eos a calculo vesicæ felleæ oriri, & proinde incurabiles prædicito, quod cadaverum sectiones te docebunt.**

Moreton, a physician of great practice in London, towards the end of the last century, had some knowledge of the intense pains these calculi occasion, though he calls them by the general
name

* De Bilis Natura.

name of colic-pains; and from those pains joined with the jaundice he sometimes pronounced that there were stones in the gall-bladder, which were accordingly found upon opening the bodies. But yet, he seems to have had no notion of their being discharged by stool, or of any method towards attempting a cure. It does not appear that Sydenham, though so careful an observer, and so great a practitioner, knew any thing at all about these calculi: at least he never once mentions them in all his writings.

And to come nearer to our own times. The great Boerhaave, if a certain anecdote be true, which I have seen in a manuscript copy of his lectures, said to be taken from his mouth, came first to be acquainted with them by opening bodies himself,

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not from the accounts published of them before his time. The passage translated into English runs thus :

*“ I for a long time wondered, what
“ should be the cause of a jaundice
“ preceded by violent anxieties, vo-
“ mitings, pain, and convulsions, and
“ that all these symptoms should go
“ off, and after a while return again;
“ till at length opening bodies taught
“ me, that in these cases the biliary
“ ducts are obstructed by calculi.
“ Hence the bile, not finding a pas-
“ sage, is accumulated to such a de-
“ gree, as to cause those anxieties.
“ But when by the violent vomitings,
“ the bile is so far exhausted, being
“ partly forced out through the ducts,
“ and partly into the vena cava,
“ and from thence all over the body,
“ as to be reduced to its ordinary
“ quantity, all the complaints cease.”*

How much is it to be wished, that

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this excellent professor, who, as we learn from Van Swieten, knew this subject so well, and so strongly inculcated the notice of it to his pupils, had thought fit to publish something to the world about it, in his peculiarly accurate and clear manner of writing.*

Some other late authors, who knew these calculi well as anatomists, seem to have taken little or no notice of them as practitioners. The celebrated Ruysch was acquainted with them as occurring in dissections, and gives some instances of their being found in opening morbid bodies. He had also seen some that were discharged by

* Baron Van Swieten. This title I was ignorant of, till after my book was in the press : for which reason, I hope, that illustrious author will excuse my silence about it in the book, and only taking notice of it in this place once for all.

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stool, but says not a word of any symptoms they occasion, or that ever he had observed them in patients. Morgagni likewise, that accurate professor of anatomy at Padua, who had seen as many of these calculi as any man, and described their figures and other properties more exactly than any author had done before him, was very little acquainted with them in living bodies; or aware that they often produce any sensible effects, or are very frequently voided by stool. He knew that some physicians had spoken of their discharge, and even quotes Fernelius for that purpose. And he mentions one calculus that he had seen in the possession of Valisnerius, which was voided præcedentibus ventris cruciatibus acerbissimis: from which instance he seems to have taken occasion to write about them. For he says, that, as every one, who saw it, did not know
what

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what it was, he thought it right to give a description of them, that they might be known by others, when they are seen to come away. He also criticises with great appearance of truth, though at the same time with great modesty and civility, upon the reports of Columbus, Vesalius, and Camenicensis, of calculi being found in the vena portarum. These, he suspects, were really in the porus biliaris. But as the ramifications of the porus run close together with the branches of that vein, and are even inclosed in the same covering of the capsula, (commonly called Glissoniana, though not allowed by our author to be the discovery of Glisson, but rather of Walæus) he says, that those writers might easily mistake between the biliary and the blood-vessels.

But when these calculi had been more frequently observed to pass by
a 4 stool,

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stool, and the complaints of such patients more nicely attended to, and compared with the circumstances of those, in whose bodies they were found by dissection, they came to be taken notice of by more practitioners, and to be more particularly treated of by some few authors than they had been before : who now began to consider, and collect the symptoms, and to put them together as the signs by which such cases might be known. Accordingly we find some late authors have thought fit to write on this subject, either as a part of their work, or in some short essays, and to speak of the cure too as well as the diagnostic signs. The most considerable authors of this sort, whose writings have come to my view, (for there may be many others which I have not seen, and I do not mean to speak of such as only contain a single case or
two.)

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two) are Bianchi, Hoffmannus, Theodorus Philippus Schacht, the author of the anonymous Essay on the Jaundice, in the first volume of the Medical Essays and Observations, Dr. Simson of Saint Andrews, and Dr. Van Swieten first physician to the emperor and empress of Germany. Some of these writings were not published, and others of them I had not seen, till after I was engaged in my work. But when I had seen them all, as none of them treat very largely on the subject, I did not think myself precluded from my design, but by some of them greatly assisted in it; since I proposed to give as full an account of this matter as I was able, by exhibiting in one view the substance of what might be collected from all the best authors I could meet with, together with such remarks on the knowledge and cure of this disorder, as had occurred to me in my practice.

Bianchi,

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Bianchi, professor of physic at Turin, in his large work of two volumes in 4to. called Historia Hepatica, wherein he proposes to give a complete account of the anatomy of the liver, and of all the diseases of that viscus, saying of the last edition of it that it is numeris tandem omnibus absoluta, allots a part of a chapter (or rather a part of two chapters, for he speaks of them in two different parts of his book) for the subject of these concretions. He is not the most clear convincing writer, is apt to speak too positively, and to draw too hasty and too general conclusions from a few particular instances. In his account of the properties of the calculi he is too dogmatical, and is for making those he had seen a standard for all; so that if we believe other authors of at least equal experience and credit, we must be convinced, that many things he says are contra-

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tradicted by facts. And what he writes about the diagnostics and cure are by no means satisfactory. He is apt to assert some things from theory, and to dispute the plain facts of other credible authors, when they do not coincide with his own opinions. Otherwise he would not have laid it down as a certain rule among his signs, that the larger the calculi are, the more pain they occasion. For this will not always hold true, even while they remain in the bladder; because it may happen, from the shape, gravity, or other properties of the stones, or from some circumstances of the patients, that a smaller stone may produce more pain to one patient, than a much larger does to another; and he might have observed a fact, contradicting this position of his, in a case he had just before referred to in Fabricius Hildanus. Besides that it
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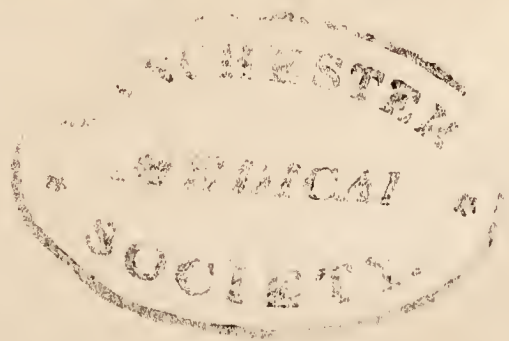
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is obvious to suppose, that the smaller stones, when they enter the duct, must occasion more exquisite pains, than the large ones, which cannot pass out of the bladder, almost ever do. Neither would he have insisted, that they always occasion some perceptible mischief, and that in some cases, where grave authors tell of calculi being found in dead bodies, which had not produced any sensible effects during life, there must still have been some observable disorders, though they were not taken notice of either by the physicians or by the patients themselves. In short, the best things this author has said on the subject are the cases he has related; some few of which are his own, but most of them collected from other writers. His cavilling disposition, and his conduct as a controversial writer, may be fully seen

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*in Morgagni's Epistles and the pre-
face to them.*

*The late celebrated Hoffman has written much better on this subject. But as he writes on it in his systematic method, in one chapter of his work, called *Medicina Rationalis Systematica*, not in a dissertation by itself, he has not treated it so fully as might be wished, and as perhaps might have been expected on a doctrine so little known or attended to at that time, and from an author who wrote so much.*

*The occasion of professor Schacht's writing on this subject was his publishing, *Herborniæ Nassaviorum*, in 4to. ann. 1724, the particular case of a patient, who had laboured under a phthisis icteritia, and also voided several calculi by stool, which our author concludes certainly came from
the*



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the gall-bladder. This learned professor and judicious practitioner does not seem to have had, at that time, much experience of these concretions in his own practice, as he speaks of but one patient more from whom he had seen them. But he quotes many accounts of them from a number of authors, both of their being found by dissections, and of their being voided by stool. His theory is not, perhaps, the most clear and satisfactory, either as to the formation of biliary calculi in general, or in explaining the symptoms of that patient's complicated case. And after all he has said about the two calculi he describes and gives a print of, there may still remain some kind of doubt, whether they were not of the intestinal rather than of the biliary kind; or at least, if they had their first origin in the gall-bladder, whether they were not greatly increas-

*ed in bulk by their stay in the guts. The circumstances which favour this suspicion are, that the external appearance of the smallest, according to the figure he gives of it, much more resembles an intestinal calculus than a biliary one; that the very great size of the other, namely, as large as a turkey's egg, * and of the weight of above two ounces and three quarters, exceeds all, as he justly observes, that were ever before known to pass the duct; and that the patient suffered unspeakably greater pains from the passing of the stone through the guts, even the colon and rectum, than while it was, as he supposes, making its way through the duct. The only method, perhaps, to have decided the question,*
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* I suppose he means a turkey by Gallina Indica, as the magnitude of his figure answers better to the egg of that fowl, than of any other I know.

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in what part these calculi were really formed, would have been to cut them in two in the middle, to observe their inward structure, and whether they contained any nucleus, and of what kind. If they had for a nucleus the stone of a fruit, or a small bone, or the like, which could never have been in the gall-bladder, this would have proved clearly, that the calculi were of the intestinal kind. And if their nuclei were evidently biliary, but the rest of their composition was like those formed in the guts, it would have appeared, that they were of a mixed kind. But if the whole substance of them had been like those found in the gall-bladder, they must have been supposed to come from thence, how difficult soever it is to conceive of the passage of the large one ; unless it can be admitted, that they might be wholly concreted, or at least

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least very much enlarged, in the duodenum, from bile stagnating there.

*The judicious author of the anonymous essay on the jaundice, in the first volume of the Medical Essays and Observations, has reasoned well about calculi being the most frequent cause of that disease, by stopping the cystic bile in its course to the duodenum, as also about the improbability and insufficiency of the other causes, which had usually been assigned for it by medical writers. He therefore argues justly, that physicians ought always to have a view to this cause, when they are concerned with iſteric patients ; and that, when no other cause appears, the general indication will be that of expelling calculi. For which purpose he says, “ medicines
“ are to be applied in very near the
“ same form and intention as are
b “ used*

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*“ used in cases of stones lodged in the
“ ureters.” But as he does not enter
into a full detail of the properties of
the biliary calculi, or of the symptoms
occasioned by them, or of any parti-
culars about the cure, he was very
far from designing that short essay as
a treatise upon the subject.*

*Dr. Simson also, a learned pro-
fessor at Saint Andrews, in the 4th
edition of that same first volume of
Medical Essays, &c. has published an
Essay on the Jaundice. By which, as
well as by the case of a patient relat-
ed in the second volume of that work,
the doctor has shewn, that he is well
acquainted with the effects of biliary
calculi, as they occur in practice. He
directs us indeed, to look further than
merely to the colour of the skin, in order
to determine a case to be the jaundice ;
since, he says, the blood may receive
such*

such a change from other causes, namely, a fever, poisons, &c. without any regurgitation or redundancy of bile, as to make the skin appear yellow. But when, with the yellowness of the skin, there is also the same colour in the whites of the eyes, the urine is strongly saturated with bile, and the stools are white, we may be sure that the course of the bile into the intestines is stopped, and that it regurgitates into the blood. And this last case only the doctor inclines to call a genuine or true jaundice. This distinction of the doctor's appears reasonable and useful in practice; for, as he says, the method of cure must be different. When the blood itself is changed by a fever, &c. without any mixture of bile, the only remedy is to cure the fever, or whatever was the cause of such a change. But when the jaundice arises from a

b 2

stop-

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stoppage of the biliary ducts, the cure must be by removing the obstruction there, and reducing the bile to its natural course. The only objection to this doctrine seems to be, that the stoppage of the duct may be partial, and such a quantity of the bile may regurgitate, as to cause a jaundice in the skin and urine, while at the same time enough may pass along the obstructed duct, to tinge the fæces; especially if the bile happens to be of a deeper colour than ordinary. So that though, when the stools are white in a jaundice, it is pretty certain there is a regurgitation of the bile, yet it does not always follow, that there is no regurgitation when the stools are yellow. The doctor well knows and admits, that there are other causes, which sometimes stop the common duct; but says, that calculi are the principal and most frequent cause,

cause, and therefore are chiefly to be regarded in the cure. It may, however, be observed, that both Dr. Simson, and the other excellent author last mentioned, speak perhaps too generally of calculi, as the cause of such a stoppage of the bile as is curable; without taking a proper notice of that kind of jaundice, which often occurs from a load of viscid humours in the primæ viæ, either of the bilious or pituitous kind; where from the absence of pain we have no reason to suspect any stones, and which we see easily cured, by bringing away those viscidities either upwards or downwards, or both ways. But indeed both their essays are short, and the design of them is to recommend to practitioners a constant attention to calculi, as the principal and most frequent cause of a jaundice.

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When the third volume of the admirable Commentaries, of that laborious and excellent practical writer Van Swieten, on the Aphorisms of Boerhaave, came out, I was impatient to see it, knowing that he would have occasion to speak of these calculi, and not doubting of his clear knowledge of this, as well as of all other diseases. Nor were my expectations disappointed, when I found how well he was acquainted with this subject from his own practice, and that his excellent instructions concerning it are chiefly founded upon his own experience. But it did not suit the nature of his work, to treat largely upon particular subjects, or to give so full an account of this, as to me it seems to deserve. Otherwise, there would have been no occasion for me to write about it.

Since

Since the above was written I find, that the learned professor Haller, that great anatomist, in a late piece called Opuscula Pathologica, has written one section upon gall-stones. He gives a very accurate description of those he found in different bodies; of their various shapes, sizes, colours, and structure; together with an account of the state of the bladders in which they were contained, of the ducts, and of the different kinds of bile found with the stones. But he says nothing about the signs of them in living bodies, or of the particular consequences of them, or of any method of cure. Nor indeed could it be expected he should, when he was writing so small a tract, the design of which was to publish an account of the dissections of some particular morbid bodies. He observes that these stones, and the disorders arising from them, become

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much more common than they used to be ; or else are more commonly taken notice of. Which last I take to be the true account of this matter. And he adds his ardent wishes, that a method of cure might be discovered for so frequent, so painful, and so dangerous a disease.

*But after this free opinion of the writings of other authors, what shall I say of my own? I will at least say thus much for myself, that I have done as well as I could, and written with all the clearness on the subject that I was capable of ; at the same time freely owning, that I wish I could have laid down the diagnostics and cure with more precision. Very glad should I have been to describe the symptoms with so much exactness, and to point out such definitive rules, that the case of these calculi
might*

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might always be known, and to establish a certain method of cure, had it been in my power. But I do not profess to write in physic with certainty and demonstration. Neither do I pretend to any nostrum, or to have discovered any infallible dissolvent of these stones. All that I propose about the cure is to treat of such means as seem most probable to be of service in the case. However, if what I have said should incline some writer of more experience to supply my defects; or if I can engage a more general attention to a subject of so much importance; I am satisfied my labour will be well bestowed. Time and future observations will afford a clearer doctrine on this head. I have chosen to write a pretty full account of the matter so far as I had materials. What I have done those only can be adequate judges of, who know

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know my subject well, and also know what has been said upon it by other writers. And to such judges I freely submit my performance, not doubting of their candour in excusing its defects. If I should be thought tedious; let it be considered for whom I write. Not for those who know my subject as well or better than myself, to whom I am far from presuming to offer instruction; but for those who know nothing, or very little about it. And when I have made digressions, either to introduce observations, or to drop hints here and there, which I could not weave into the thread of my discourse, relating to other diseases, or about the nature and use of medicines, I hoped that those things might be as useful to some readers as my main subject itself; by enlarging their knowledge of some of the more common diseases; by fix-

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ing in their minds a due sense of the great danger, and absurdity, of trusting to any one universal indiscriminating method of practice in any disease, a thing which, though far from being new, can hardly be too often inculcated; and by shewing them the necessity of judgment and caution in the use of some of the most common remedies, and the expediency of a timely application of them, especially in those diseases where there is most danger of delay, and where a too late use of some of the best remedies may do harm instead of good.

I thought it right, in this preface, to give the history of the notice that has been taken of these calculi from their first discovery to this time, so far as it had occurred to me in the authors I have met with.

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I have been pretty long in the introduction, designing to speak of some other diseases, especially some of the more obscure ones, and of the causes of obscurity; not with a view to give them up as inscrutable, but as a motive to further inquiries, by diligent and accurate observation of all the most intricate cases we meet with, by opening the bodies of those who die of them, and faithfully recording their histories; in hopes of bringing to light, by a series of observations, the diseases of some of the viscera which at present are but little known. Into which train of thoughts I was, perhaps, the rather led, from the consideration of the disorders arising from these calculi being formerly among the unknown diseases. To say something about the colic, and some other diseases that are too often mistaken for it, came the more obviously

ously in my way, because the disorders I was to treat of are always called by that name by such as do not understand the cause of them. And as speaking of the colic introduced the mention of the paraphrenitis, I thought proper to say so much about it, because it is a disease that has been taken too little notice of by most writers.

To say something about the bile appeared necessary, both for the sake of such readers as are not acquainted with that doctrine, and as a further introduction to my subject.

*In the chapter about the production and properties of the calculi I chose to treat pretty largely, and to connect the several facts, relating to the gradual changes of the bile from its natural state,
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and to the various appearances of the calculi, as they have been discovered by dissections, and by discharges from living bodies, into as regular and clear a history as I was able to do. Which I have done not as a matter of curiosity, or only as a piece of natural history, nor yet merely, that the different kinds of calculi may be known, when they are seen to come away from patients ; but because, as I apprehend, some of the particulars may help towards forming a better judgment of the state of some patients, and also afford hints, which may sometimes be usefully applied both towards the prevention and the cure of calculi.

The chapter about the signs is so much the longer, as I have endeavoured not only to describe the particular symptoms arising from calculi
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as clearly as I was able to do, but also to distinguish the case from some other disorders which proceed from other causes, some of whose symptoms bear a near resemblance to those we are treating of.

But what I suspect will most of all be reckoned tedious is the chapter about the cure, which is run out to a great length, by my speaking largely of some remedies, and of some particular medicines, not only with regard to the case of biliary calculi, but also to many other diseases. All that I can say for myself, by way of excuse, is, that I apprehend there is a class of readers, to whom this part may be useful; and for that reason, I hope, I shall be forgiven by those, to whom it may seem quite superfluous and tiresome.

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*I have not given way to hypotheses, or amused myself with speculation, but have dealt in facts; because all our reasoning is of no value any further than it is founded upon, and supported by facts. Without such a foundation, the finest chain of mechanical reasoning, the strictest mathematical demonstration, the clearest theory built upon the laws of hydraulics, are all but airy dreams and imaginary knowledge, and can be of no use towards investigating or explaining the nature of diseases. For though mathematics, mechanics, and hydraulics, are in their own nature certain, and can render other sciences certain, so far as they can be introduced and furnished with experiments and sufficient data, yet the difficulty is to apply them to physic. And if our reasoning is ever so just, but goes upon wrong premises, of
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what use can the conclusion be? Nay must it not, if applied to practice, be the foundation of error, which in physic may be of the most dangerous or even of fatal consequence? How many authors have been fondly amused with their own speculative schemes, imagining themselves to be much wiser than they really were, and even supposing, that physic was capable of being made a demonstrable science by the help of mathematics? But none of them has shewed the proper method of application, or formed a solid plan to build their calculations upon. For unless we can apply lines and figures, measures and numbers, to the animal machine, of what use can mathematics be in physic? When we know not the exact figures, the diameters, and elasticity of the vessels, nor can ascertain the several properties of the fluids,

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or the momentum with which they are moved ; and more especially when all these are so frequently, nay almost perpetually, varying ; how can we make any particular application of the laws of hydraulics ? And if it is difficult to apply these sciences to the human body, while it is in health, in order to explain the animal œconomy in its regular course ; how much harder still must it be, to make any use of them towards understanding the phænomena of diseases, in which the various springs and actions of life are interrupted and put out of order numberless ways ? Let us take for example some particular disease, a fever suppose, or a dropsy, an apoplexy, or an asthma ; let us consider their various appearances, and the endless variety of the causes from which they proceed, and then try if we can reduce them to mathematical

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matical principles. Let us try if we can apply the same principles to particular medicines, to ipecacoanha for instance, or to rhubarb, or jalap, to the Peruvian bark, or to opium, &c. and thereby explain the operation of these several medicines on the body, and the changes they produce on the solids and fluids. And till these things can be settled, as certain data, to ground our reasoning upon, we may speak or write in a mechanical or a mathematical style, (which was very much the fashion in the former part of this present century) but shall not speak or write the more intelligibly, or more to the advancement of the knowledge and cure of diseases. Should we not therefore, in the mean time, content ourselves with facts, and with such plain reasoning as is evidently deducible from them? And is not he undoubt-

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edly the wisest and best physician, who is acquainted with most facts, and at the same time both knows, and carefully considers, how to make the best use of them in his practice, whether he is a great proficient in mathematics or not?

I could not forbear, here and there as it came in my way, taking notice of the dangerous mistake of those, who, though ignorant of physic, are yet very forward in prescribing for themselves and others. The fondness of the present age for quackery is sufficiently obvious; and the fatal effects of it too often occur in practice. The vulgar, who are apt to think every thing true they see in print, are often deluded by the high praises and bold promises they meet with in news-papers, and in the bills of direction (which are commonly worse than

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than the medicines themselves) concerning this and that retailed nostrum: and people in high life, who are not always more knowing about diseases and medicines than the vulgar, learn from one another, being guided by fashion in physic as well as in dress. Many of both sorts have a great inclination to be their own physicians; which they shew, not always by following the example of our wise forefathers, in observing the rules of temperance, a regular diet, and proper exercise, (the only sense in which every man can be his own physician) but by taking upon them the cure of diseases, both for themselves and others: in the execution of which office, they not only trifle with insignificant things under the name of remedies, but also venture to prescribe such medicines as require the nicest skill to use properly, and which,

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if misapplied, can hardly fail of doing harm. I am not so vain as to imagine, that any arguments of mine can have force enough to abolish this prevailing custom, and more especially because, when it is exercised on their poor neighbours, it has the appearance of being founded on motives of humanity. But yet, if those, who are so fond of acting the physician's part, could be convinced of the difficulty and hazard of their undertaking; if they were sensible of the danger of trifling with inefficacious medicines, till the disease is fixed and become incurable; if they could be made to perceive the dreadful consequences of giving hot spirituous medicines in all kinds of colics without distinction; if they would believe the frequent pernicious effects of their using opiates, sold under various quack-titles, for young children, and
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in many cases for adults; and if they would reflect on the manifest impropriety, and the palpable absurdity, of trusting to one universal medicine, (of how great virtue soever it may be, and whether its composition be publickly known or is a secret) in all kinds of fevers, in every stage of them, and for all patients, how different soever their constitutions may be; I say, if they could be convinced of these things only, among the numberless hazards they run, I am persuaded, that many of them would be disposed to give up their practice; and surely the rest would become less confident in it. Some at least might be made so apprehensive of the danger of falling, some time or other, into one of these fatal errors, as to find that courage in their practice, which before they thought themselves justly entitled to from some appearances of

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success, greatly diminished. And if only some few, who may happen to read what I have written on this head, should be so far influenced by it, as to learn some caution in these respects, I shall reckon my time has not been altogether uselessly employed. Nor should I think much at any pains I could take, if I could do any good, even though it was but a little, in a matter of so much consequence. For is it not unquestionable, that preparations of opium, and also many other quack-medicines, even if they are good in themselves, are often misapplied by the vulgar? Must they not very frequently mistake the cases of patients; and not seldom be misled by the ignorant and extravagant accounts they read of the too extensive virtues of these medicines? And can such mistakes fail of proving very injurious, or even fatal, to many?

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many? Is it not therefore much to be wished, that it might not be in the power of any thus to impose upon mankind for the sake of private gain; and that no such medicines might ever be suffered to be exposed to sale, especially under the sanction of royal authority, unless both the form of their composition, and the directions for the use of them, are first approved, and certified by proper judges in physic appointed for that purpose? And even then, if, upon such approbation, an exclusive license be obtained, is it not still to be wished, that the venders of these private medicines should be subject to some inspection, both with regard to the goodness of the drugs, and to the faithful preparation of them according to the form given in? Is there not, at least, as much reason for this, as that apothecaries, who are regularly brought up
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*in the knowledge of the choice of drugs, and of the manner of compounding them, and are also required to prepare them according to a public established form, should be subject to the visitation of the college of physicians? Otherwise is it not in the power of these nostrum-merchants, whether they are the original proprietors, or the heirs, or the purchasers, of the receipts, either from ignorance, or avarice, to dispense what they please among the people, without regard to any consequence, except their own gain? Are there not many of these medicines, which are only pretended nostrums, without any just title to such a name, consisting merely of common ingredients; either, perhaps, compounded with some little particular variation of form from the like medicines in common use, but without any superiority of virtue; or else actually
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made according to some old forms, but purposely disguised to give them the air of novelty? But if any man has really found out some new medicine, the safety and usefulness of which will bear the examination of proper judges, and the test of experience, and is desirous of making a private advantage of it, is it not better for the community, that he should be rewarded at the public expence, for making his discovery known, than be allowed the sole privilege of selling his medicine as a nostrum, for the common people to have the administering of it? Are not ignorant people generally more fond of, and also more free with, private quack medicines, than with those of the apothecaries shops made by the direction of the college of physicians? And yet are they not likely to do ~~no~~ less mischief with the latter than with the former,

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it may be supposed, that, when they go to buy some particular medicines at the apothecaries shops, they will often be asked questions and receive cautions about the use of them; whereas the retailers of the quack-medicines generally know no more about the virtues, or the proper use of them, than the buyers themselves, and only sell them for the sake of gain, as they do their other wares? Whether I have done any good, or not, by my remonstrance against the mischief of quackery, it is, at least, some satisfaction to have borne my testimony against so great an evil. § If it should be objected, that I have descended too low in taking so much notice of it; I answer, that I reckon nothing below me

§ Is there not just reason to apprehend, that, taking in the bulk of mankind, more lives are destroyed by quackery, rashness, and ignorance than are saved by the most regular, careful, and judicious practice?

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me, in which the health and lives of men are concerned. And I know that they are very much concerned in this case, as they are exposed to great danger by the misapplication of opiates, and of hot spirituous medicines designed for colics, and by making the use of any one fever-medicine, be it what it will, too general. If some should be offended, and others should laugh at me for it, I shall be alike unmoved at each kind of censure. And if any will imagine, that what I have said proceeds from private views, from fear that my business should be lessened by the prevalence of quackery; I would only beg of them, to give due attention to my arguments, so far as they are of importance to the public, and then let them take their own liberty in supposing what they please concerning me. But those who know me well, or know that I write at a
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time of life, when I have little to hope, or to fear, with regard to myself, and when I am not desirous of great hurry and fatigue in country practice for the sake of gain, will be inclined to absolve me from all suspicion of selfishness, and to believe my motive to be, not a prospect of my own benefit, or of the private advantage of the faculty, but, as indeed it is, a view to the general good of mankind.

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THE INTRODUCTION.

IN order to cure diseases, it is in the first place necessary to understand them well ; that is, to know in what respects the body that is disordered differs from the same body in health. And this supposes a knowledge of the make and condition of the human body in a sound state, and that not only of its external parts, but also of the situation, structure, and use of its several internal organs. Which knowledge is learned from anatomy, or the artificial dissection of the human body. Anatomy therefore, and a due acquaintance with the animal œconomy, are previously necessary to a right understanding of physic ; and he that is ignorant of these must be as much at a loss, how to
B judge

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judge of many internal diseases, as a man is to discover and rectify the disorders of a watch, or any other complicated machine, who does not know how that machine is made. A patient feels himself out of order, and any by-stander can perceive that he is so, perhaps by his countenance, or by his complaints, and by observing a difference in many respects, from what he sees and knows to be the case of a man in health. But, in many inward diseases, neither the one nor the other has any notion of the nature of the disorder, or can imagine what part is affected, and in what way; nor can it be known by any one, who is not acquainted with the inward structure of the body. It is therefore the business of the physician, to judge from the patient's complaints, and from all the circumstances of the case well weighed and considered, what part of the body is out of order, and in what manner it is affected. He is to distinguish one disease from another, by the symptoms peculiar to each of them. And as the same disease, and
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the same symptoms, in appearance at least, may arise from different and even opposite causes, and on that account may require a very different, or a contrary method of cure; he is to consider the signs of the several causes, in order to adapt his directions to the particular nature of the case. When the kind or situation of the complaint is such, that there is some ambiguity about determining, which of two or more contiguous parts is affected, he deliberates carefully about the reasons, why he should fix upon one of those parts and not another. For this purpose, he calls in the assistance of his knowledge of anatomy, and of the different offices of those several suspected parts, and considers what appearances ought to be expected, if the seat of the disorder was in one part, and what in another. And to this he joins his knowledge of the history of diseases and their symptoms, as built upon observations, and handed down from the earliest foundation of physic to this time, and of the discoveries made by opening morbid bodies. For as anatomy

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teaches us the natural make of the body in a sound state, the opening of morbid bodies shews, to one already acquainted with anatomy, how the several internal parts are changed, and have their structure and use destroyed, by different diseases. Anatomy, therefore, is not only one of the most curious parts of natural philosophy, and worthy of the attention of all who study the works of nature ; but is also one of the most useful branches of science, as it lays the foundation for that knowledge, which is to teach us, how to preserve the body in health, and to repair it, as far as may be, when it is out of order. A physician then, knowing the offices of the several parts, observes which of those offices fail, or is not performed in a regular manner, and from thence concludes, what part is the seat of the present disorder. And he judges in what way such part is affected, and from what cause, by the preceding history of the patient, by the present symptoms, and by recollecting what appearances have been found in opening bodies dying of diseases

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diseases in that part. It is evident, therefore, that these distinctions cannot be made, nor this judgment formed, by one that is ignorant of the structure of the human machine. Nor should a man of the greatest knowledge of the animal œconomy be in a hurry, when he is to judge of difficult cases. There are some cases so obscure and perplexed, that they are not to be hit off at first sight, nor to be discovered by a superficial inquiry ; but require time and attention, with a careful discriminating examination of all the circumstances of the patient, before the true state of them can be determined. Without this care the wisest man may mistake the case, or know no more about it, than another man who is destitute of that necessary previous knowledge. For to what purpose is any man's knowledge, if he will not allow himself time to make a proper application of it? There is, doubtless, a great difference in men as to quickness of apprehension, and also as to experience ; so that one may discover a difficult case much sooner than

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another. But still, I say, there is also a difference in cases. Some are obvious, and easy to proper judges at first view ; others are to be found out by diligent attention, and by that only ; some that are not knowable in their beginning, will become evident in their progress or maturity ; and it must be owned, there are some that will be too hard for all our inquiry and consideration, and cannot be fully discovered, but by the anatomical knife, after the death of the patient. However, without a proper examination, it cannot be told, whether a difficult case is discoverable or not ; and a hasty view may take that for unsearchable, which leisure and due attention might be able to find out. Besides that a due enquiry gives a man the satisfaction of having performed his duty, and done all in his power, whether he is able to find out the case, and to cure it, or not.

Those internal diseases are, in general, most easy to be discovered, which have their seat in such viscera, whose functions
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are best known; as then by observing the *functio læsa*, we readily perceive, that such a part is out of order. And the functions of those viscera are most obvious, whose office it is, either to perform some of the vital motions, or to make some sensible secretions or excretions. Thus if the organs of respiration are out of order, or the action of the heart, the spring of the circulation, is disturbed, such disorders are more easily perceived, than when some other parts are affected, whose action is not so immediately necessary to life. If the secreting or excreting organs fail in their proper offices, their diseases are much more evident than those of some other organs, which do not separate any fluid from the blood themselves, nor make any discharge out of the body, but only prepare the blood for the other viscera, or some way assist them in the performance of their several offices. The disorders, for example, of the stomach, of the guts, the liver, and the kidneys, are easier to be known, than those of the spleen, the omentum, or the mesentery.

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And of the secreting organs, the diseases of those are most plain, whose secreted fluid has the most sensible properties. Thus the diseases of the pancreas, though it is a secreting organ, and separates a large quantity of fluid, are not so easy to be known as those of the liver and kidneys. The pancreatic juice has not such sensible distinguishing properties as the bile and the urine have. It is not discharged out of the body alone like the urine, and therefore a failure of this fluid is not perceived at once, as a suppression of urine is, when either the kidneys do not separate it from the blood, or the bladder is not able to expel it. The use of the pancreatic lymph in a sound state, when it enters the duodenum along with the bile, is to dilute the food just passed out of the stomach, as also to temper the bile, and so to assist in completing the digestion, and a due preparation of the chyle. And probably almost all this thin animal fluid, being mixed with the chyle, enters the lacteals, and returns to the blood along with the new materials, and
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but little of it passes down with the fæces, when the body is in health; or at least, what passes that way does not discover itself by any peculiar marks in the fæces, as the bile does. If the quantity of it is too sparing, the digestion will be impaired, and the body will be out of order, and fail of its proper nourishment, though the cause be not very evident. On the other hand, if it is excreted in too large a quantity, it may occasion many disorders, and among others a diarrhæa; which yet may not be distinguishable from too great a flow of humours from the glands of the stomach and guts, as the sensible properties of these several fluids so much resemble one another. The situation also of this viscus, immediately under and behind the stomach, may occasion some of its disorders to be confounded with, and taken for, diseases of the stomach itself. Therefore Boerhaave speaks too superficially of the diseases of the pancreas, as well as those of the spleen and omentum, when he says, (Aphorism : N° 958.) that an inflammation, suppuration, mortifi-

tification, schirrus, and cancer, in these viscera, are to be known from what he had said of those same diseases in the liver and stomach. And he would have done well to have laid down, if he could, the peculiar distinguishing signs of them in the pancreas, &c. which to other people are more obscure. In this he would have done very eminent service, because it would have been teaching a kind of new doctrine, or at least, what has not been well taught, so far as I know, by any author. For though we have many accounts, from observations of opening morbid bodies, of these several diseases in the pancreas, spleen, &c. yet these accounts are often but of little use, for want of a proper history of the patient's complaints, and of all the circumstances that attended them. So that it does not seem to be easy, from the discoveries hitherto made, to assign such clear and full diagnostics of the diseases of these organs, as will effectually distinguish them from diseases of all the contiguous parts. This, however, should not discourage us, but

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but rather excite our diligence in searching after a clearer knowledge of these diseases, by accurately observing and faithfully recording the progress of them, together with the appearances found in bodies dying of them.

But besides the obscurity that arises from the office of some internal parts, another cause of it may be from the different make and texture of the several parts. Those which are of a more lax or spongy make, or which hang more loose, will not discover their diseases so readily, as those which are composed of more tense fibres, or are more confined and firmly connected by ligaments and membranes: since the former can bear to be stretched and enlarged by obstructions, without that pain which will be found in the latter. An inflammation, for example, in the pleura, or diaphragm, in the coats of the stomach, or guts, will be much more painful, and thence more discoverable than in the lax, spongy, and more insensible substance of the liver, spleen, or omentum. Many

Many diseases also must be obscure, or perhaps not at all knowable, in their first origin, or before they have acquired any proper form, which will afterwards, in their progress, and by their consequences, come to be very evident. Who can tell in the beginning of many slow chronic cases what they will come to? Very often this can no more be known, than we can tell at the sight of a new-born child, what sort of a man he will be. When obstructions first appear to be forming in some of the viscera, who can always foretell a slow lingering suppuration, which will end in a tabes, or that the consequence of them will be a dropfy? Even in external diseases, as tumours, inflammations, &c. where, besides the complaints of the patients, we have the assistance of our eyes and feeling to direct our judgment, we cannot always determine at first, what will be the issue; whether a tumour will resolve, or suppurate, or mortify, whether it will grow schirrous, or cancerous, &c. What wonder is it then, if some obstructions and tumours

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in the internal parts, should be yet more obscure, especially in the beginning, both in the nature and event of them? For are not these internal disorders, in a great measure at least, out of the reach of our senses, and chiefly to be judged of by the complaints of the patients; and do we not from too many of our patients, even after the strictest inquiry, procure but a very imperfect and confused information; nay, and sometimes receive such a wrong account, that, without great circumspection, we are in danger of being misled in our judgment of the case by what they tell us of it? In such a situation, a wise physician, after having made the most careful and accurate inquiry, suspends his judgment, waiting for further light, and forbears giving his opinion, or making his calculations, till he can obtain sufficient *data*; and in the mean time directs his prescriptions as the indications arise, in order to palliate the case, and relieve particular symptoms, and to prevent an increase of the complaints as far as he can; but is not willing to
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make any great push, till he can discover where to point his aim. For, as on the one hand he is careful not to lose an opportunity of affording all the help in his power, so on the other he is cautious not to be over hasty, or to exert his strength in the dark, lest he should happen to join forces with the disease against the patient, and nature should be stormed and overpowered, instead of being assisted and relieved. But how few patients, or rather friends of patients, who are often more inquisitive than the sick persons themselves, can bear to be told, that the case is not to be determined at present, but is beyond the compass of human knowledge, till time makes a further discovery? Many people are extremely solicitous to be told what their friend ails; I have sometimes thought them more anxious about the case than the cure. They want a name for the disease, whether the present particular set of symptoms is clear and regular enough to have any name properly belonging to it, or not; and though very often, when

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a name can be given, they are not at all the wiser for it. However, give them but a name, and they are in some sort satisfied, at least for the present; and can then better bear to be told of the uncertainty and doubtful issue of the case. But if a physician is fair and open enough, to tell them he does not yet know, (which would sometimes be better sense, as well as more agreeable to truth, than to amuse by some general, un-instructing, or ambiguous name) but must make further observation, and see the disease more completely formed, before he can determine; they are apt to think the fault lies more in the physician, than in the obscurity of the case. And being dissatisfied, they often run from one to another for advice, by which the opportunity of observing the progress of the disease is lost; and at last perhaps fall into the hands of a quack, or some bold pretender to skill, who will speak positively about things, which not only he knows not, but which are not in their nature to be known at present, and even though he runs the hazard of hav-

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ing his opinion contradicted by the progress and event of the case. Thus these people deceive themselves, and are better pleased with the false dogmatic assertions of the ignorant, or assuming, than with plain truth modestly told them by wise men. If the case is such as they can see, or know something of themselves, they have more patience to wait the event, though it be long. A fever, for instance, they know often lasts a good while, and is uncertain in its issue; and many cases in surgery, they are aware, require time, which therefore they can readily allow, and yield implicitly to the skill and directions of the persons employed. But if they are told the truth of an internal chronic case not yet intelligible, they are dissatisfied, and apt to fail of their confidence in the physician, of whom they had a good opinion before. And yet, perhaps, what they reckon a defect, or a mark of ignorance, may be a stronger proof of his wisdom and judgment, than all the instances upon which they had founded their esteem of him. He may
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very possibly shew more real knowledge, and accuracy of discernment, in pronouncing an obscure case to be at present undiscoverable, than he had done in treating a fever, or some other evident disease, which had an happy issue. And indeed, the physician may often be as much perplexed, and as uncertain in his own mind, in observing the course of a fever, especially if it be irregular, or of a mixed kind, or has appeared at first in one shape, and afterwards in another, (and so may the surgeon be in watching the progress of an external disorder) as in considering an internal chronic disease. Only in the first case, it is plain in general, that there is a fever, and in the other a disorder obvious to the senses; whereas in the internal chronic case nothing may be evident, but that the patient is not well, the cause of the complaints being as yet quite unknown.

Another cause of obscurity, and which often makes it difficult, or even impossible to determine some particular cases, is the

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complication of disorders in several inward parts at the same time. This sometimes occasions a great confusion of symptoms. And the appearance of things may be such, that it may be hard to say how many parts are concerned in the case, where the principal seat of the disorder is, what part was primarily affected, and how far the disorders in the others depend upon that first part. It may also sometimes be very difficult to judge by the complaints, whether some of the parts affected are really vitiated themselves, or only suffer by their connection with some other parts, or by a communication of nerves. Thus the stomach often suffers from disorders in the kidneys, in the guts, liver, pancreas, &c. and sometimes there may be a real fixed disorder in the stomach, and in some one or all of these other parts at the same time. And in some great obstructions of the liver, which hinder a free passage of the blood in its return from almost all the viscera of the lower belly to the vena portarum, all these parts, that have the circulation thus di-

disturbed, must be out of order in consequence of the original obstruction of the liver. If the stoppage of the liver can be removed in due time, before the other parts are too much hurt, the blood will have its free course again, and, in consequence of that, the disorders of those other parts will be carry'd off. But in other cases, there may be original obstructions in some of these other viscera, as well as in the liver, or even when the liver is not affected. So that it will sometimes be difficult to know, whether the other complaints depend upon the bad state of the liver, or upon other causes.

In some obscure cases, when they are arrived to a certain degree, it is much easier to see what the event will be, than to say precisely what the case is; as perhaps it is not this or that, but a complication of several diseases: in which, though it may be difficult, or impossible, to unravel the whole, we may yet see clearly enough to be able to pronounce, that the case will end fatally. We may see that the constitution is much decayed,

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that the body is so shattered that it cannot be repaired ; though we cannot always determine the particular state of every internal part, or tell the precise disorder of every spring and movement. We may suspect, or even know, that such or such parts are affected ; and there may be at the same time great mischief in some other parts, which, either from the nature of those parts, or the kind of disorders in them, or from the confusion of symptoms, has not afforded any sufficient signs, by which it might be fully discovered. There may be some encysted tumour, or some indolent schirrus, which may either destroy or impair the function the organ in which it is contained, or, by pressing upon some other parts, may prevent the proper nutrition of the body, or disturb the circulation in those parts, or some necessary secretions or excretions : or there may be some latent abscess, which having formed itself by a very slow and gradual suppuration, may have remained imperceptible, being free from the signs that attend a quick impostumation ; in
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like manner as we see in the external parts, where a sluggish suppuration is sometimes formed by such slow degrees, and almost without any pain, or sensible inflammation, that it is doubtful, when the tumour is fully ripe, whether it contains pus or some other fluid. Those who have been conversant in opening morbid bodies, or in reading the accounts of them, are abundantly sensible of the truth of this; as they well know, it is often found by dissection, that more parts were concerned in the case, than they had seen reason to suspect; that there are great depravities in some viscera, of which there had appeared no symptoms during the patient's illness; that sometimes such uncommon anomalous appearances are found, as could not be expected or even thought of, as is evident from numberless examples in the most authentic histories of morbid dissections; and sometimes, that several of the principal organs have been decaying at the same time; insomuch that it not only appears plain, that there was no room for medicines to take effect,

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but also seems astonishing, that some of the necessary vital motions could have been carried on so long.

Sometimes also there may seem to be a complication, when there is properly none ; that is, when all the inward parts are found except one only. Thus when the liver, or spleen, or some other viscus, has grown by degrees to an enormous size, or is some way misplaced, so as to press upon the other viscera, and in some measure take up their place ; (as in fact the liver and spleen have been sometimes found to reach to the lower part of the abdomen, or to press up the diaphragm) we may well suspect other viscera, whose places are thus occupied, to be themselves affected, and especially as their action may be greatly disturbed by the pressure of those which are so much overgrown. What perplexity, or impenetrable obscurity has been occasioned by a mere adhesion of two or more internal parts, and especially when it has happened between such parts as are not often found to adhere

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here together, and whose natural situation is not contiguous? If any one viscus, having been extended by an inflammation beyond its natural bounds, and brought into contact with other parts that were distant from it, has adhered to them, and remains fixed after the inflammation is gone off; suppose that viscus to be the liver, or the spleen, or suppose it to be the urinary bladder, which had been stretched by a suppression of urine also as well as by the inflammation; is it not easy to conceive, that inexplicable symptoms may arise, and that there may be the appearance of strange complications, when there is really no disorder besides the adhesion?

Let not any be offended at my owning, that we are at a loss in many cases; from the structure and office of some of the internal parts; from seeing diseases while they are, as it were, in embryo, or before they are completely formed; from a confusion of symptoms, arising from the complications of several diseases

together, and from a peculiar odness and obscurity of some disorders, which have no determinate signs, nor any proper name or class to refer them to, and, being singular cases, are not possibly to be known but by the anatomical knife. Or if any are offended, let them contradict what I have said, and remove the obscurities I have owned. Why should we pretend to perfection and infallibility, and to know what is not to be known? Are there not many things in all nature, that are beyond the reach of the human capacity? How much, therefore, too high is the compliment paid to Fernelius, by Plantius the writer of his life, in supposing, that no disease, tho' ever so obscure, occurred to that famous practitioner, which he did not presently discover; or that no set of symptoms were so various and perplexed, but that he could unravel them, and refer each to its proper cause? This surely was ascribing to him a knowledge quite beyond the powers of human nature. The more clearly a man understands diseases, the more is he sensible of the

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the obscurity of many cases. And here, as in other parts of nature, the greater his knowledge is, he finds there are so many the more things which are not to be known. The wiser he is, the more he perceives his own ignorance. A wise man finds that his knowledge of nature consists chiefly in facts, and is very cautious of admitting any reasoning, but what is clearly deducible from them.

But, on the other hand, let not others think, that we know nothing in physic, because we do not know every thing ; or that we can do no good, because we cannot make men immortal. For though it be true, that many die of cases which are dark and intricate, or even quite inscrutable, yet many more did so formerly than now ; and there are innumerable cases, where we know clearly enough, what part is affected, and in what manner ; and are able to pronounce, that there is an abscess, or an ulcer, or a mortification, or some other incurable disorder, in this or that internal part, and to
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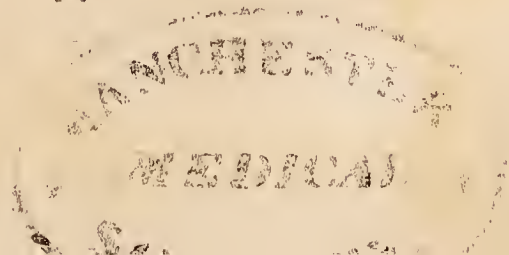
appeal to the anatomical knife for the proof of our judgment. It appears also from what I have said in the preface, that the disorder, which is the subject of the following chapters, namely concretions in the gall-bladder and ducts, was formerly one of the unknown cases; it being very little, if at all known, till anatomy came to be well cultivated, and the opening of morbid bodies frequently practised. Which practice, if it was to become general in all obscure cases, as is much to be wished, would afford a continual increase of knowledge; we should grow wiser in judging of many diseases, especially complicated ones; and likewise of some simple ones too; particularly those of the pancreas, spleen, &c. as before said, and in prognosticating at least if not in curing. But even in curing too in some instances, and in preventing in others, and in stopping the fatal progress of some diseases by taking them in time, we have good reason to hope, that our knowledge would be greatly promoted. And though it should not answer these
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salutary purposes so far as might be wished, yet surely it is one part of wisdom, to know how far our art can extend, and where, from the nature of things, it must necessarily fail us; where we can probably afford assistance, and where the decay is too great to be repaired.

In speaking or writing about diseases, we should be as accurate as may be in the use of words; so far at least as to avoid confusion in calling one disease by the name of another, or many diseases by the same name. In order to this, we should not deal too much in general comprehensive terms. . There are some general names, which are used for several diseases, that are very different from each other in their nature, their causes, and cure. But we should be very careful, how we apply these general names to particular cases, without proper limitations and distinctions.

Thus, fever is a general word, which stands for several diseases, that differ very
8 widely



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widely in their properties, and require very different and even opposite treatment. So that if we speak of a fever, we can say but little clearly and definitively about it, unless we distinguish the kind of it by its peculiar symptoms. Therefore if a physician is only told of a patient, whom he does not see, that he has a fever, and is desired to direct what is proper to be done to cure it, he will give no advice at all, because he can give none properly, unless he could know the nature of the fever, whether it be of the inflammatory, or the low kind, or of what other particular sort it is ; and be also well informed about the time and state of the fever, with all the symptoms attending it, as well as the age, strength, and constitution of the patient ; and all other circumstances of the case. For without being duly informed in all these particulars, he knows his advice is as likely to do harm as good ; since that which is the best remedy in one kind of fever, and in one set of circumstances (whether that remedy be bleeding, or blisters, or the bark,

bark, or any other medicine) may be absolutely wrong and pernicious in another. It is as absurd to suppose, that any one medicine can be proper for all sorts of fevers, in all the stages of them, and in all constitutions, as that the same sort and quantity of food can suit all stomachs. We might as well at once imagine one single universal medicine, to cure every disease, and to make mankind immortal. Yet how many people are there, who, knowing little of fevers and their different natures, but having heard of a medicine for the cure of fevers, venture boldly to prescribe it to their friends and neighbours ; even though it be a medicine, whose composition they understand not, but whose operation is evident and powerful, and which is therefore capable of doing great good, or great harm, in different circumstances ? Many of these, who thus freely undertake the cure of fevers, where life is often in immediate danger, and sometimes hangs on a slender thread, would think it inexcusable, to interfere

fere in some other much less dangerous cases ; or to intrude upon the surgeon's province, even in slight disorders, where the life of the patient is not at all at stake. In the case of fevers they are not afraid of doing harm, not being aware of the hazard they run, but acting on a blind presumption, that if the fever is curable, this medicine will cure it. So that if the patient recovers, they think they have cured him ; if he dies, it was the fault of the case, not of the medicine, nor of their misapplication of it. They succeed sometimes, or seem to succeed, in some easy cases, or in strong constitutions that can bear almost any treatment, and therefore growing bold in the practice of the rules they have received, whether they understand them or not, they presume to undertake all kinds of fevers, let the nature and circumstances of them, and the constitutions of the patients, be ever so different. Whereas in a case of surgery, which is visible, they are shocked at the thoughts of the patient's suffering any kind

kind of deformity, or the least impediment in the use of a limb, or even of a finger, through their mistake.

Again, the word colic is another name which in common use has been made too general. There is, perhaps, no name of a disease that has been more erroneously used than this, that has been applied to more diseases to which it does not belong, and whose misapplication has been attended with worse consequences. Almost all pains in or near the abdomen, or pelvis, what part soever is the seat of them, or from whatsoever cause they proceed, are by many people called by one common name, the colic; even when the guts are either not at all, or at least not primarily or principally affected. So that not only pain in any part of the intestinal tube, whether from wind, costiveness, inflammation, &c. but also painful obstructions, and inflammations of the other viscera, of the liver, pancreas, spleen, omentum, mesentery, kidneys, bladder, uterus, &c. and even of the diaphragm itself,

itself, are called the colic. Hence often great mischief, and even fatal consequences arise; as these cases are either neglected or ill treated, in the beginning, for want of knowing the seat of the disease, and the true cause of it. By which means the disease is confirmed, or aggravated, and the opportunity of applying the most proper remedies is lost. When people have a notion of the colic, how common is it to have immediate recourse to some strong spirituous liquor, either mixed with purgatives, or without? How common is it for families to keep a medicine of this sort under the name of a colic tincture, or the like, made by some famous receipt, looked upon as an inestimable treasure? This the good lady reckons an infallible remedy for all curable colics, and therefore dispenses it with a bountiful hand to her own family, and to her poor neighbours. And some who are not so happy as to be possessed of such a receipt, buy *Daffy's elixir*, or something of that kind, for the like purposes. And if the disorder is in the stomach or guts, arising

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sing only from wind or crudities, which want to be carried off, and the patient is easily moved by stool, a moderate dose of a warm opening tincture may be a proper remedy, and quickly remove the complaint. But when the pain arises from inflammation, whether in the stomach or guts, or any of the neighbouring parts, and requires large and repeated bleeding, with all the cooling method, how dangerous must these hot medicines be? Is it not evident, that they must necessarily add fuel to the fire; especially when, from the weakness of their purging quality, large or repeated doses are required to open the body? And who would either take them, or give them to others, if they had any notion, that the disease proceeds from the same kind of cause as a pleurisy, and requires a like method of cure? The fatal effects of this kind of colic-medicines, wrong applied, are frequently met with in practice; and yet the prescribers of them, not distinguishing cases, nor being sensible of the danger, go on in their usual method, encour-

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raged by the success they observe in colics from flatulencies and indigestion. A dreadful instance of this sort I saw in a strong man, a servant to an old lady, who would have sent for me at first, if she had apprehended him to be in danger, as she always used to do for every one of her family ; but being told that this man had a colic, she sent him some *Daffy's elixir*, and repeated the dose. After some days, the patient growing no better but rather worse, I saw him. When I had examined the case, I told the lady, that it was not a colic, as from the seat of the pain, being low on the side and reaching to the back, it had been supposed to be, and represented to her ; but that it was a most violent fever from an inflammation in the diaphragm, or midriff, which is the partition between the belly and the chest, a disease like a pleurisy, but commonly more acute and dangerous ; that the *Daffy's elixir* was a very improper and hurtful medicine in this case ; that large bleeding at first would have been the best remedy, but that the

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time to use it freely, or with any prospect of success, was in a great measure elapsed; and that in the present circumstances there appeared very little hope of recovery. The lungs being also affected, with his cough, which was very violent, he came to expectorate pretty largely, in-somuch that, at one time, I began to conceive some hope, that he might happen to escape. But after struggling some days longer under a very laborious breathing, great pain, restlessness, and anxiety, the pain ceased, the expectoration stopped, and the man died. The body was opened, as the poor man, from a humane disposition, had himself desired; that the cause of his great sufferings (which, though it was evident enough, he thought must be unintelligible) might be discovered for the good of others. A mortification was found, as was very easily foretold, in one side of the diaphragm, and in the lower and back part of the lungs, which also adhered to the diaphragm.

The paraphrenitis, or inflammation of the diaphragm, is one of the most violent acute distempers; as it is seated in a part of exquisite sensation, being composed of muscular and tendinous fibres, and which is in constant motion every time we breathe. This disease does not, I think, happen very often, at least not near so often as a pleurisy, and yet probably much oftener than it is known. When it is in the sides, it is apt to be taken, by incompetent judges, for a pleurisy; which such persons (not knowing that the pleura lines the inside of the whole thorax, and that an inflammation may happen in any part of that membrane) suppose to have its seat only in the sides; and they are ready to call every acute pain there, even a true colic, when it happens high in the sides, in the flexures of the colon, by the name of pleurisy. But this mistake is of much less consequence, than when, from its being seated very forward under the cartilages of the ribs, or very low in the back near the loins,

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(at both which places the tendinous fibres of the diaphragm are inserted) they take the case for a colic. Because the method of cure in a paraphrenitis, and in a pleurify, is much alike ; and all people, even the vulgar, have a notion, that bleeding is necessary in a pleurify : though too many indeed are apt to defer it too long, or to use it too sparingly in the beginning, which is the proper time for it ; and sometimes too freely when it is too late in the case, and may do harm instead of good. Whereas, when a paraphrenitis is taken for a colic, it is great odds, that not only bleeding (the principal remedy, and worth all the rest in that disease, as it is likewise in some colics) will be neglected, but also that wrong and hurtful medicines will be administered.

The symptoms of a paraphrenitis, according to the part of the diaphragm that is affected, may resemble those of a pleurify, a peripneumony, or a nephritis. When it is seated near the edges of the diaphragm

which are fixed to the ribs, the symptoms are a good deal like those of a pleurisy. When it has its seat more in the middle, in the thick muscular part of that organ, it will appear more like a peripneumony, but be attended with much greater pain. And when the lower tendinous parts, that are fixed to the vertebræ of the back and loins, are affected, it may resemble a nephritis, but will be attended with more cough, and a greater difficulty of breathing; there will also be less vomiting, and the symptoms will not be the same with regard to the urine as in a nephritis. It does most frequently indeed resemble a pleurisy, or peripneumony; but when it does so, all the complaints are commonly more violent. The pain is extremely acute, and still more aggravated by breathing, coughing, sneezing, swallowing food or drink, straining to vomit, or to make water, or go to stool, than in a pleurisy; because the diaphragm is more concerned in, and more moved by, all these actions than the pleura is. The breathing also is more quick and laborious, and

requires to be performed in a more erect posture of the body, and with as little motion of the diaphragm and abdomen as may be. The anxiety and restlessness are excessive, and in vain does the miserable patient try to find a posture, which can afford him any ease, or scarcely indeed any mitigation of his distress. And as these symptoms are so violent, the fever is proportionally intense ; and there is usually an earlier and higher degree of delirium, which also continues longer, if the patient holds out. I once saw a long and great delirium in this disease, in a strong man, who at last with great difficulty recovered. Convulsions also generally attend this case in those that die, and particularly that convulsive kind of laugh called *risus sardonicus*. This particular spasm has, indeed, its name from a plant called *sardoa* or *sardonia*, which affects those who eat it in this manner; the stimulus it causes on the nerves so contracting the muscles of the face, that those who die of it seem to die laughing. But the like spasms from other causes are also

called by the same name, and are said to happen more especially in inflammations or wounds of the diaphragm. There is among the *Observationes Fantoni*, Obs. XI. a case of a man dying delirious, whose liver and diaphragm were both found inflamed. The author adds, that the man had for the most part a laughing in his delirium; the mouth and cheeks being by consent of the nerves thrown into various kinds of distortions.

The paraphrenitis is sometimes single, and is also sometimes mixed (as other inflammatory diseases frequently are) being joined with a pleurisy, or with an inflammation of the lungs, or of the mediastinum, pericardium, oesophagus, stomach, liver, or other contiguous parts. When single it is very dangerous, and for the most part fatal: but when connected with an inflammation in some of these other parts, the case is still the more acute, and destroys the patient the sooner. And though in such a complicated inflammation, particularly if the pericardium, oesophagus,

phagus, or stomach are concerned, there may be such a confusion of violent and desperate symptoms, as to make the particular diagnostics less clear; yet, at the same time a fatal prognosis may be the more evident and certain. Sometimes indeed, when an inflammation of the lungs is joined with it, and there is also some adhesion of the lungs to the diaphragm, the patient may stand a better chance, than in a single paraphrenitis; that is, if there be a free expectoration, by which the whole case may be relieved.

This disease may, like other internal inflammations, sometimes, though rarely, go off by resolution; and when this does happen, the patient commonly seems to have had a very narrow escape. Or it may possibly, when in a small compass, in the fleshy part of the diaphragm, and not in the most violent degree, come to a suppuration; as has been, in some few instances, found in opening morbid bodies. But, from the necessary motion of
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the part, and the usual violence of the case, it much more commonly makes a quicker progress, and ends in a mortification. And when the patient does survive, till an abscess can be formed, there seems to be hardly any chance, unless possibly from expectoration, by a communication with the lungs. For if the abscess breaks into the cavity of the thorax, there can be but little, if any, hope from any remedy, or even from the paracentesis itself. And if the matter falls into the abdomen, what can be expected, but a hasty purulent dropy, if it may be so called; and that the patient must necessarily pine away very fast, from a corruption of all the viscera, that are surrounded with the corroding pus; unless he happens to die suddenly upon the first breaking of the abscess, and so escapes this last helpless scene of putrefaction and misery.

At other times I have seen an hepatitis, or inflammation of the liver, taken for a colic, and treated as such. In one instance

stance the disease was pretty evident, from the seat of the pain, from the jaundice, and fever; which were all greater than many times happen in inflammations of this viscus. This patient seemed to be in the utmost danger from the acute fever, and after that was over, I was very apprehensive of her sinking under a tabid hectic, from an abscess in the liver. But she had the happiness to escape both, and to recover perfect health. In another patient, the case was much less clear at first view, especially as no jaundice attended. Yet, upon deliberate attention to all the circumstances, I judged the liver to be the seat of the disease: and that the inflammation, which was very violent, would soon be succeeded by a mortification and death; which accordingly so fell out within two days after I first saw the patient. I obtained leave to open the body, and found the liver mortified, particularly the whole concave part of it, and no disorder in the guts, or in any part of the other viscera.

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But of all pains that happen in or near the abdomen, there are none which are more generally called by the name of colic, than those which are occasioned by biliary calculi. The patients themselves always call this disorder a colic, and it is often so reckoned by many that undertake the cure of patients, either from too hasty a view of the case, or not being acquainted with these calculous obstructions, or not able, by an attentive consideration, and a nice distinction of circumstances, to find them out. And it is no wonder that those persons, who are not aware of the true cause, should think of treating these cases with such medicines only, as are usually prescribed in disorders of the guts alone, and without any view of expelling calculi, when they are not so much as thought of. Whereas, when patients complain of violent pains about the pit of the stomach, and region of the liver, without a fever; if those practitioners, who understand the animal œconomy, and know how to distinguish cases, would always recollect these biliary calculi,

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calculi, as at least a possible cause, and a proper subject of their considerate inquiry; I am persuaded they would sometimes be discovered, where they are overlooked; and that it would be evident, that they occur in practice much oftener than they are commonly supposed to do. That they frequently happen I know by experience. Whether so often as stones in the kidneys, as Dr. Simpson says they do, I cannot take upon me to assert; but I am, from my practice, inclined to be of opinion with the doctor, that it may be so, or even oftener, though they are far less generally known than the urinary calculi. Professor Haller says, that at Gottingen at least, the biliary calculi are far more frequent than those of the urinary kind. He tells us indeed, that the people there are so uncommonly happy, that the stone in the urine-bladder is one of the diseases most rarely to be met with; and that in dissecting 230 bodies, in the anatomical theatre there, he found calculi in the urinary passages of no more than two. At the same time he gives an accurate description

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tion of gall-stones found in no less than thirteen bodies, most of them dissected in that same theatre. These cases, however, are not intended to settle a proportion between the two diseases. And, indeed, any calculations of that sort must, so far as I know, be formed upon observations yet to be made; which ought also to be made in countries not remarkably exempted from, or liable to, either of those diseases.

One of the first remarkable cases of this sort, which fell under my observation many years ago, was called by the person, who had the care of the patient before me, an odd kind of colic. And indeed, there appeared to me something uncommon. Therefore, as the case was perplexed, and no jaundice yet appeared, I am not ashamed to say, that I sat by the patient a whole hour, observing, examining, considering, and comparing the seat and manner of the complaints with all the other circumstances of the case. At length, I declared my opinion to be,
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that neither the stomach nor guts were the parts primarily affected, but that obstructions in the biliary ducts were the cause of this colic ; and that probably we should soon see a jaundice come on, which would give further light into the case. My opinion was not assented to at first. However, I said, I had formed it upon mature consideration, and would not depart from it, unless I saw reason to alter my mind. Within four days the jaundice appeared, which gained some credit to my opinion ; and within four more the obstructing bodies were found in the stools, and the patient very soon grew well. I had committed the search to a very careful person ; otherwise, the calculi, which were small, had been thrown away undiscovered, and the patient had got well, though it had not been known how ; as often happens in this case for want of a proper examination of the stools. †

† When solid bodies are found in the stools of these patients, they should be preserved for the inspection and examination of proper judges, and not concluded to be gall-stones from the report of ignorant people ; who if they find

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find any thing particular among the fæces, are apt presently to imagine it to be what they were ordered to search for. Thus I have heard of cardamom seeds, of the seeds of oranges, of pills voided whole as they were swallowed, and the like, being taken for gall-stones. I once saw a small white very hard stone, that was found in the stools of a patient of mine, whom I strongly suspected to have biliary calculi: but upon due examination, I determined it to be one of the white pebbles, which are often found among dried currants; and upon inquiry was informed, that the patient had lately eaten some cake or other food which had currants in it.

CHAP.

C H A P. I.

Of the BILE, or GALL.

THE bile is a particular saponaceous fluid, secreted from the blood by the liver, which is the largest gland in the whole body. It seems to be made of the oily and saline parts of the blood, intimately united together, and mixed with a due proportion of serum. When inspissated, by evaporating the watery or ferous parts, it may be formed into a kind of resinous, or perhaps rather a wax-like substance, which will burn. Formerly the bile was reckoned to be an excrementitious fluid, as the urine is, separated merely to free the blood from noxious particles. But the manifest properties of it, as appears by many experiments, the peculiar contrivance for its

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secretion, the part of the body where it is deposited by its ducts, which is in the first gut just below the passage out of the stomach, and the disorders that arise from its deficiency in the *primæ viæ*, plainly shew, that it is not an useless fluid, but is designed for very important purposes in the animal œconomy. The bile is of two kinds, namely, that of the gall-bladder, called *bilis cystica*, and that which comes directly from the liver to the gut, called *bilis hepatica*. The cystic bile is thicker, of a deep yellow colour, and very intensely bitter. Whether this bitterness is owing altogether to its stay in the bladder, and having some of its serous parts absorbed; or partly to the mixture of any other humour received from glands seated in the inward coat of the bladder, (which glands are said to be similar to those that secrete the wax in the external cavity of the ear) or to what other cause joined to these, I will not presume to determine. The hepatic bile is thin, more transparent, much milder in taste, and less powerful in its operation. They are
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both conveyed by their proper ducts, through the common duct, to the first gut, called the duodenum, where they are mixed with the digesting food soon after it passes out of the stomach.

The hepatic bile comes from all parts of the liver by the small biliary vessels, which accompany all the minutest ramifications of the vena portarum through the whole substance of that organ, and which uniting into larger and larger tubes fall at last into one trunk, called the *porus biliaris*, or hepatic duct; which, in a sound state, is continually transmitting its contents into the gut; so that the quantity of this bile is very considerable. The cystic bile is much less in quantity, and does not seem to flow constantly into the gut, as the hepatic does; but to be expelled at times, when the bladder is filled with it to a certain degree. Its expulsion is occasioned partly by the contraction of the coats of the bladder and of the duct, their fibres being stimulated by the weight of the bile, and by some degree of acrimony which it acquires by

its stay in the bladder ; and partly by the pressure the bladder receives from the neighbouring parts, from the stomach when it is distended, from the colon, the abdominal muscles, the diaphragm, &c. and perhaps also it may be assisted by some postures of the body, as the passage for the bile out of the bladder should seem to be easier, when the body is supine, or recumbent, than when it is erect. This bile is conveyed from the bladder by the cystic duct ; which, after it has passed some way from the bladder, meeting with the hepatic duct, unites with it at a very acute angle, and both together form one larger duct, called the ductus communis choledochus ; in which both the biles are mixed, and carried into the duodenum. Which the duct penetrates obliquely, pretty much in like manner as the ureters do the urinary bladder ; and having passed a considerable length between the coats of the gut, at last opens into it just about the place where it also receives the pancreatic duct.

That

That the bile is of a saponaceous nature appears by a plain experiment known to the vulgar, that is, the use of the gall of oxen in washing linen, scouring wool, &c. where, like soap, being mixed with water, it helps to wash out grease and other stains, which the water alone could have little or no effect upon. And soap, we know, is made of oil or fat, and a strong lixivium of fixed alcali salts, incorporated together by boiling into a due consistence. Which composition will not only itself dissolve in water, but being united with oily, resinous, or other tenacious bodies, make them also, contrary to their own nature, dissolve and mix with water in like manner. That bile is capable of dissolving gums and resins the painters well know, and on that account find it of great use in mixing some of their colours. And that it can dissolve other tough, tenacious bodies, appears by its effects upon the hard curd in the stomach of a calf, which is so much changed in its consistence, after it has passed the duodenum.

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The bile in its natural state is not properly either acid or alcali, but approaches nearer to the latter than perhaps any other animal fluids do; which is easily conceived from its having a greater tendency to putrefaction, and appears still more probable, if, as some authors say, besides volatile salts common to all the fluids and solids, it contains also some share of a fixed alkaline salt in it, which is not found in any other of the humours of the body. And, perhaps, partly by its salts, and partly by its bitterness, (as other bitters are supposed to do so more or less) it resists and corrects acids and acescents in the *primæ viæ*.

This saponaceous fluid then being secreted and brought into the duodenum, it there meets with the aliments just passed out of the stomach, and so far digested as they can be by that bowel alone; and being intimately mixed with those contents of the stomach, and with the pancreatic juice (towards which mixture the stop made in, or at least the slow passage

page

sage through the flexure of the duodenum greatly contributes) it helps to dissolve the more tenacious glutinous parts, and to unite the oily and watery ones, and perhaps to blunt some too acrid particles; and so the whole mass is fitted to be further elaborated, as it passes along the jejunum and ilium, into a perfect chyle, to be taken up by the lacteals, and from them conveyed by its proper channel, the cisterna lumbaris and thoracic duct, into the blood. Thus the bile is mixed with and makes a part of the chyle, and probably a large share of its finer parts enters the lacteals, and returns directly to the blood; nay, perhaps almost all the hepatic bile may be thus disposed of, unless, as some suppose, a part of it is taken up by the meseraic veins, and by them carried directly to the vena portarum.

For it is most wisely provided, that a foreign fluid, though taken in to recruit the blood, and for the nourishment of the body, should not be sent into the blood alone, nor in too great quantity at

once; because its heterogeneous qualities would produce sudden, violent, and fatal effects, namely, coagulations, and consequent stagnations, &c. as is found by injecting the most mild innocent fluids, such as milk, oil, &c. into the veins. It is therefore contrived, that the aliments should be gradually prepared to be received into the blood, and previously mixed with a large proportion, and a great variety, of the humours of the body, which have already made a part of the blood, and been secreted from it. Thus all the food, both solid and liquid, is mixed with the saliva, the humours of the œsophagus, of the stomach and guts, with the pancreatic juice, and both the biles. And these all intimately blended together make up the chyle, as it is in the guts; which, as it passes along the jejunium and ileum, has its finer parts imbibed by the lacteals. But even this fine lacteal chyle is not yet sufficiently prepared to be received into the blood, till it has been furnished with still further supplies of animal juices from the glands of the mesentery, and from the lymphatics.

tics. These are continually sending in their fluids to mix with the chyle, as it passes all the way from the small mouths of the lacteals, through all their circulations which they make in the mesentery, and their larger branches in which they unite, and through the cisterna lumbaris and thoracic duct, till it arrives at the subclavian vein. At which place it is with most exquisite wisdom ordained, that the blood should receive its fresh supplies, from a fluid composed partly of new and foreign materials, united with, perhaps, a much larger share of the natural humours of the body. For it was not sufficient, that the chyle, which is to be turned into blood, should consist of so large a proportion of animal juices, which have already undergone the laws of circulation and secretion; but it was also necessary, that even this fluid, thus compounded, should be received into the blood by little and little, and at the most proper place. Here then the chyle, being pressed up the thoracic duct, opens the valve of the subclavian vein, (which valve is

is so fixed as to hinder any blood from getting out of the vein into the duct) and enters gradually into it; where being mixed with the blood of this vein, and of others which return their blood into it from different parts, but particularly with the large quantity that descends from the head by the jugulars, it is presently carried to the vena cava, by which it is conveyed to the heart, and from thence to the lungs; and by the action of both these organs, together with that of the arteries, it is intimately mixed, and completely elaborated, so as to be fully transformed into the nature of blood, and made fit to circulate with the rest of the mass through the whole body.

The finer parts of the bile being thus disposed of, even its grosser parts, though, perhaps, they may in some sort be called excrementitious, are not without their further use. These gross parts of the bile, remaining mixed with those parts of the other animal humours, and of the food,

food, which are not fit to pass the lacteals, that is, making a part of the fæces, help to dissolve and prepare them for passing out of the body, and also to stimulate the fibres of the guts for their expulsion. As to the food, it is evident, that some of its solid fibrous parts are not wholly digestible by the power of the animal organs; any more than the bran of wheat is by trituration reducible into flour; or than the skins of almonds or seeds, though ever so much beaten, are capable of being dissolved in water along with the pulp. These solid parts may be macerated in the stomach and guts, and have all their juices extracted from them; but the fibres themselves remain indissoluble, and must therefore make a part of the fæces, which are to be expelled out of the body. Nor is it to be wondered at, that there should be some remains even of the animal humours, of the bile, mucus, &c. which are not fit to pass such exquisitely fine strainers as the lacteals; when we consider the large quantity of solid excrements made by children,

children, and other young animals, whose food is only milk, and also by some sick people, who are supported altogether by thin liquids. And that the gross bile is thus employed appears from its properties, from the colour of the *fæces alvinæ* in a natural state, from their white colour and hardness, and the sluggishness of the bowels, when the bile is deficient, or is become weak and inactive.

That the bile is of so much use and importance in the animal oeconomy, and that the health of the body greatly depends upon the proper state and distribution of it, is plainly seen from the disorders which attend the body in consequence of its defect, or excess, or wrong qualities. When this salutary fluid is in right order, and has its proper natural course, it contributes greatly to keep all things right in the *primæ viæ*, in the whole intestinal tube, and of consequence in the blood and in the whole body. For good chyle makes good blood, by which the body is nourished and kept in health;
but

but when the chyle is bad, the blood is vitiated, and the body not only fails of its proper nourishment, but becomes subject to many diseases. So when the bile is stopped from passing into the duodenum, either wholly or in part, or has lost its saponaceous virtue and is become inert, we find many disorders in the body, in proportion to what is amiss concerning the bile. If it is only weak, as in children, the primæ viæ are much disposed to acidities; which, if they are not corrected, and afterwards gently evacuated, become the occasion of many other disorders. And in adults, when the bile is obstructed, or become inactive, the appetite and digestion fail, and hence follow crudities, acidities, flatulencies, cachexies, atrophy, dropsy, &c. On the other hand, if the quantity of bile is too large, or it is excreted too fast, or if it is not right in its quality, but is too strong, acrid, and stimulating, it produces another train of disorders. That fluid, which used to have such salutary effects, when it flowed in its regular course, in due proportion,

portion, and of its natural qualities, is now become offensive and noxious. When the bile comes to be almost the only contents of the bowels, without a due proportion of other animal humours and of aliments to temper it, they are not able to bear its stimulus, but have all their functions disturbed. If by its irritation the peristaltic motion of the guts is inverted, and it is thrown up into the stomach, it occasions nausea, heart-burn, vomiting, hiccough, &c. When it goes only downwards, it produces colic, gripings, diarrhæa, dysentery, &c. But it may also move both upward and downwards, and so bring on a cholera morbus. And if the stimulus in the primæ viæ is great, and of long continuance, and especially if some of the bile, less mixed and diluted with the other milder animal fluids and with aliments than it ought to be, is taken up by the lacteals, and enters the blood, it may occasion various kinds of fevers, inflammation, mortification, &c.

I

Thus

Thus much being said about the nature of the bile, and its effects in the primæ viæ, upon the chyle, and the blood; we come now to take notice of one property of it, with which we are particularly concerned in this treatise; namely, that when it stagnates, its grosser parts, or dregs, are very apt to coagulate and form concretions. This we see by experiments made with bile, and by its spontaneous changes, when it is out of the body. And when by any means the bile is stopped or retarded, so as to stagnate long either in the gall-bladder or ducts, especially if before the stoppage it was unusually thick and viscid, or abounded more than ordinarily with earthy particles, it is readily formed into biliary concretions, or gall-stones, of various kinds, which shall be the subject of the next chapter.

There are many causes, which may contribute towards the inspissation and stagnation of the bile. Of this sort Hoffman mentions a declining age, a sedentary

tary inactive life, a slower circulation of the blood, and the use of spirituous liquors. Hence, he says, biliary concretions are much oftener found in old decrepid people, than [in those who are in the flower of their age; oftener in women than in men, and especially after the age of fifty; when the quantity of blood in women being greater in [proportion, and of course its circulation more difficult and slow, the more thin and watery parts, both of the blood and of the bile, go off by the lymphatics, and leave the remainder of both thicker. He says also, that spirituous liquors tend to the production of calculi, partly by their coagulating quality, and partly by their heating the body, and thereby dissipating the thinner parts of the fluids. That all these things may help towards the formation of biliary calculi, there is no doubt; and especially when they meet with other concurrent causes, which either stop the free course of the bile after it is secreted, or by hindering a proper digestion of the food, and a due consistence
and



and distribution of the chyle, or by disturbing the other secretions and excretions, prevent the making of good bile. Van Swieten too speaks of a sedentary life as one great cause of them, as no doubt it is, perhaps the principal cause we know; and therefore, he says, they are so frequently found in studious persons. And he takes notice of compressing the viscera of the abdomen, especially when the stomach is full, as another cause. This is an error, that too many people ignorantly or inconsiderately fall into, by sitting to read or write in a stooping posture, leaning upon and pressing the stomach and belly; which, as it may injure the health in many other respects, may possibly contribute to the production of these concretions. He likewise mentions some of the passions of the mind as causes of them, and particularly anger, and long continued grief. The passion of anger is observed to have a singular and wonderful effect upon the bile, and there are many remarkable instances upon record, besides that of Fernelius's angry old man, (whose

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gall-bladder seems to have been petrified and united into one substance with the stone) of large gall-stones being found in bodies which had been much under the influence of violent anger. And long continued grief, it is well known, has powerful and very pernicious effects upon the whole body; preying upon the vitals, impairing the appetite and digestion, and disturbing the circulation, the secretions and excretions, and all the functions of the body. As therefore on these accounts it is productive of many diseases, so among the rest, it may very reasonably be supposed to be one cause of these concretions. But perhaps we should add to all these causes a peculiar disposition of the body, owing to circumstances which are not to be explained. For we do not see gall-stones bred in all who are old, or lead an inactive life, or whose blood moves slowly for any other reason. And they are sometimes found in those who are not old, nor want exercise. My experience agrees with Hoffman's, that they are much oftener met

with in women than in men. I have seen such cases, perhaps, in five women to one man. Some of them indeed were towards the age of fifty, or upwards, but I believe, near as many were much younger women, and such as were not past child-bearing. For though, *cæteris paribus*, women are more liable to them after fifty, as they are to the gout, and to the stone in the urinary passages; yet when the constitution is strongly disposed to breed them, they may happen without those concurrent assistances to their production which age brings on. But I never met with them in children, as we do stones in the urinary passages; nor have I happened to see them in very young men or women, not in any that were under thirty years old; though such cases have often occurred to other practitioners. And that even children are not altogether exempt from them, as some writers have supposed them to be, appears from one case of a boy under fourteen, in whose body the ductus communis chole-

dochus was found full of light spongy yellowish stones *. I have also heard, from a person of undoubted credit, of their being found in the gall-bladder of a child much younger than that boy. And as to spirituous liquors, they may help towards the formation and increase of gall-stones, especially in bodies disposed to them ; but there are numbers of people who destroy themselves by drinking, having their liver schirrous, perhaps, or some other way greatly decayed, and yet never have any of these biliary concretions ; and, on the other hand, they are often found in the most temperate people, who have never dealt at all in spirituous liquors.

* Medical Essays, vol. II. artic. 30.

C H A P. II.

Of the Formation and Properties of
BILIARY CONCRETIONS.

THAT stony concretions are sometimes formed in many, I may say in most, parts of the body, in almost all the viscera of the abdomen, and of the thorax, nay, even in the brain itself; and also in some of the external parts, is a fact so well known, from anatomy, and from cases that occur in the practice both of physic and surgery, that I need not produce examples, or quote authorities to prove it. But of all parts of the body, the biliary and urinary passages are beyond comparison the most subject to them. And in these principally, if not only, of all the internal parts, can the existence of concretions be certainly known by any peculiar characteristic signs; and from these chiefly, if not alone, except from the intestinal tube, and possibly from the pancreas, can a discharge of
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them out of the body be expected, or hoped for, in the natural course of things. When concretions happen in other parts, they are not easily to be known; as there seems to be no proper signs of them, unless they come within the reach of our senses, to be seen or felt; nor is there any way for them to be discharged, except by some breach, either accidental or artificial, made in the parts that contain them, or that nature prepares a passage for them by means of a suppuration. In these ways calculi have been seen to come from the tonsils, and from some external tumours, particularly of the encysted kind; not to reckon the chalk-stones in gouty persons. Stony concretions have sometimes, though rarely, been found in the lungs in dissections, and they have also been brought up from thence by coughing, either from a laceration of the vesicles, or after a suppuration. But how could they be known to have been there, till they were seen? How could the disorders occasioned by them be distinguished from the like disorders

ders arising from other causes? A stone has sometimes been found in the heart. But could it ever be known or suspected, while the patient was alive? Or, if it was possible to be known, is there any way by which the patient could be freed from it? Calculi have been much oftener found in the spleen and pancreas. But in neither of these viscera likewise are there any signs of discovering them in living bodies. And as to those of the spleen, there is no way for their being expelled, unless a passage should be made for them by an adhesion, with a consequent inflammation and suppuration, as sometimes happens for those of the biliary kind. From the pancreas they may possibly be discharged into the duodenum, and so out of the body, if the calculi are very small, and formed in the large branches of the duct, or if the duct is greatly enlarged; though they very rarely, if ever, are thus voided, or at least known to be so. The concretions which are formed in the guts are not easily discoverable by any determinate signs, or at least till they are near

coming away. These indeed are for the most part expelled out of the body sooner or later ; though they are often detained there for a very long time ; and sometime prove the occasion of a fatal obstruction of the bowels. But of these we shall speak more largely afterwards. That stones often happen in the kidneys and urine-bladder is a fact which no body, even of the vulgar, is ignorant of. This is a disease which has been long known, perhaps from the infancy of physic ; as some of the symptoms are very evident, and as the small stones are sensibly discharged, and cannot fail to be observed. And that gall-stones are frequently formed, for the most part in the bladder, though sometimes in the ducts, we know as certainly as we do the existence of urinary calculi, but the former have not been known near so long, nor are they near so generally known to this day, as the latter.

We know the biliary concretions by finding them often in dissections ; and
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from thence are sure, that we are not mistaken about them when we see them discharged by patients. The usual way of their being voided is by stool, which happens very often. They may indeed possibly be brought upwards and discharged by vomiting; and this is a case which has been observed in fact, though but rarely. Hoffman gives one instance of it in his second history of cases from biliary calculi. And there is a case, among Riverius's *Observationes communicatæ*, undoubtedly of this sort; though the doctor who writes the case, and was himself the patient, was so little acquainted with these things, that he supposes those yellow and ash-coloured calculi, which he vomited up, to have come from the spleen by an imaginary passage through the *vas breve*, as it was called in those days. † There is yet another way, by

† The two following clear examples of these calculi being discharged by vomiting are the observations of Dr. Huxham at Plymouth, which he mentioned to me in a letter, since this treatise was finished, without any design of their being published. But the doctor having, at my request, granted me his permission to print

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which they are sometimes seen discharged from patients, and that is from an abscess in the liver and gall-bladder, which has communicated with the teguments of the belly, and through them made its way outwards.

These concretions happen much oftener than is commonly supposed; and
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print them, I here recite them in his own words :
“ Many Years ago a Gentlewoman, between thirty
“ and forty, laboured under very frequent and exceed-
“ ing great Pains in the right Hypochondrium, and epi-
“ gastric Region, icteric Symptoms. violent Vomitings,
“ constant Eructations of Wind, obstinate Constipa-
“ tion, and Tension of the Abdomen, with high-co-
“ loured Urine, and Clay-coloured Stools. At length
“ She vomited up, after an incessant Torment for three
“ or four Days, a Kind of Gall-stone exactly resem-
“ bling a Bit of rough yellow Amber, as big as the
“ largest Pea, or a small Hazel-nut, and much of the
“ Shape of the latter. She was immediately relieved,
“ and so continued. I had another Gentlewoman un-
“ der my Care, who after the most stubborn and se-
“ vere Colick, Vomiting, Jaundice, &c. threw up
“ two or three friable Stones, or bilious Concretions,
“ of a dark Olive-colour, with very much black and
“ green Choler, and forthwith recovered a tolerable
“ State of Health, for some Time at least; tho’ many
“ Medicines, and even the Bath-waters had been tried
“ before for a considerable Time to very little or no
“ Effect.”

are the occasion of many disorders, which are not seldom imputed to other causes for want of being acquainted with the nature and effects of the calculi, and of observing them to come away by stool upon the going off of the patients complaints. Yet there are signs, by which they may be known to be present, and to be the cause of the symptoms that appear, and this perhaps, sometimes at least, altogether as clearly as we know the case of a stone in the kidneys or urine-bladder. But of this when we come to the chapter about the signs of them.

The place where they are found is for the most part in the gall-bladder. Sometimes, though rarely, they are formed in the hepatic duct, as appears by dissections, and by the shape of them when discharged from living ‡ bodies. And they have been found in the ramifications of the porus bilarius, pretty far up in the liver. Reverhorstius gives * a singular instance of

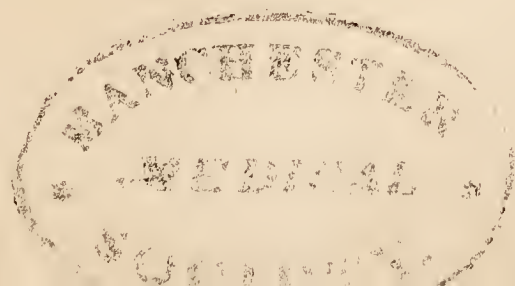
‡ Vid. Glisson Anatom. Hepat.

* Vid. Reverhorst. De Motu Bilis circulari, p. 42. atque tabul. 11. figur. 1.

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of concretions found in several branches of the porus ; not of a long cylindric or conical form, taking their shape from the vessels that contained them, as is usual in those found there, but formed into separate oval protuberances, (which at first sight he thought were so many little schirrous tumours) distending only those parts of the vessels where they lay, the other parts above and below the calculi, retaining their natural size and figure. They are often found in the cystic duct ; but then these are to be supposed generally to have come from the bladder, unless it appears that the bile has been long stopped in this duct ; for if it stagnates here, it may form into concretions as well as in the bladder and hepatic duct. But besides these ordinary stations of the calculi, in the reservoir and canals of the bile, where only they might be expected to be met with, they have been found also in the very substance of the liver, or immediately under its external membrane, out of the course of the bile and its vessels. These indeed happen rarely, nay, so seldom

dom, that Ruyfch says, he once found a calculus in the parenchyma of the liver, and never but once in all the livers he had had under his hands for different purposes ; but there are instances of this sort to be met with in other anatomists and observers. If they are of the true biliary kind, they seem to have been at first formed in the small branches of the porus biliaris ; and, as they grew large, to have broke loose from their station, and made their way through the substance of the liver, till they came to be either fixed between some of the large vessels, or confined just under the membrane that covers the liver, or to have protruded that membrane into a bag for themselves to lodge in, as in that case of Benivenius mentioned in the preface. Or if they are not truly bilious, they may possibly be formed like calculi in the spleen or other viscera, and though formed in the liver, have no proper bile in their composition. And as they are extraordinary cases and not within the compass of our subject, as there are no signs
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by which they can be known, nor any hopes of a cure for them if they could be known, we shall take no farther notice of them here.

As to the immediate causes, and the precise manner of the formation of gall-stones, I shall not pretend to enter into a minute disquisition about them. I shall not undertake to describe the figure of their constituent particles, to speak of the little hooks by which they entangle and unite with one another, as some authors imagine to themselves, or to shew how they shoot, after the manner of salts, into such a particular form. What do we know of the intimate nature and composition of bodies, any further than they can be discovered by experiments, and made the objects of our senses? But, I think, we may conceive ^{we} ~~at~~ at least as clearly about the production of these, as of the urinary calculi, or of the chalk-stones of the gout. We have probably very nearly the same ingredients for their composition, and we have besides

sides another very considerable material, the bile itself. And that the biliary, urinary, and gout-stones have some connection with each other appears plainly by experience. That the gout and stones in the urinary passages are often found in the same patient is well known. Nor is it a new thing to observe the gout joined with biliary stones. And that biliary and urinary stones happen frequently together, is a thing mentioned by many authors, and known to every practitioner who is well acquainted with both. Both sorts have been voided by the same patients, and there are instances without number of both being found in the same bodies by dissection. Kentmannus tells us, that in the body of Frederic III. elector of Saxony, there was a large stone in the gall-bladder, a large one in the urine-bladder, and one in the kidney. Georgius Frank * de Frankenau, found twenty three pretty large stones in the urine-bladder, and twenty two of various sizes

* Satyr. Medic. p. 582.

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sizes in the gall-bladder. And Hoffman * gives an example of stones found in both bladders, and also in the kidney of an old man who had been long troubled with the gout. Nor is it any wonder, that when there is a calculous disposition in the blood, many of its earthy particles should be carried to, and often deposited, in the liver, or some of its biliary passages, as the blood of this viscus is different from any other in the whole body, and is circulated by peculiar laws. For this blood is returned from almost all the viscera of the abdomen, after it has performed its office there, and some of its finer parts have been separated from it; and also has but a slow motion in such a long tract of veins, little assisted by muscular motion, unless when the body is in exercise. And when it is arrived, from all these parts, at the vena portarum, it is to be conveyed through the liver by this vein, which here performs the office that an artery does in all the other secreting viscera; though its coats

† Observat. 1. Cap. de Dolor. & Spasm. a calcul fell.

coats are much weaker, and consequently it must have less force to propel and attenuate its contents than the arteries have. So that for all these reasons it may be expected, that the earthy particles of the blood should be more apt to stop about the liver than in most other parts of the body; and either of themselves, or being united with some gross bile, to form concretions in the biliary passages; and more especially, when from any additional cause, as the want of usual or necessary motion of the body, the bile is made to stagnate, or to move slower than in its natural course. Accordingly we find, in brutes at least, whatever is the case in men, that biliary concretions are much more common than those of the urinary kind; and that they happen to brutes, particularly horned cattle, much oftener in winter, if not only at that time; as they are then fed with dry food, and also use less exercise than in the summer, when they move freely about the pastures.

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The evident ingredients then of these concretions seem to be the gross tenacious dregs of bile, and an earthy substance separated from the blood, of a similar nature to that of which the urinary calculus and the gouty chalk-stones are composed. Either of these ingredients are capable of forming concretions singly, or at least with very little, if any mixture at all, of the other ; though for the most part both have a share in the composition, and they are often combined and cemented together in very different proportions; from whence results that great variety, which is observable in the properties of the concretions. I have seen some that seemed to be mere inspissated bile, without any appearance of earthy particles mixed with it ; and others that seemed to be pure earth, with little or no bile joined to it, and both from the same patient. In the case of one woman, who had suffered very violent pains for several days, there were found in the stools several yellow solid but softish bodies, somewhat

what like the inspissated gum of a cherry tree, but not transparent; which were doubtless only bile coagulated into that consistence. The next day there came away one little round stone, not bigger than some large peas, which was so slightly cemented together, that by handling it broke into a whitish sandy earth; and there was also in the same stool about a spoonful of the same kind of sandy earth not cemented at all*. When all these were discharged, the pains were presently gone, the jaundice disappeared as soon as could be expected, and she became well. From another woman I saw some of these whitish earthy stones, that were strongly cemented, and so very hard, that they required a heavy stroke with a hammer to break them. A few days after this patient voided a great number of the more common sort, made of a plain mixture of earth and bile, which could easily be crushed to pieces by

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* There is a like instance of a spoonful of gravelly matter voided with a large stone, in the Philosophical Transactions. Motte's Abridgm. part II p. 105.

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pressing them with the thumb and finger. In the former of these cases there were none of the usual mixed kind of concretions, but each sort seemed to consist of one single separate ingredient. And probably both the sorts were in a somewhat imperfect state, perhaps but newly formed, and would have acquired a firmer cohesion and consistence, if they had remained longer in the bladder. This may very reasonably be supposed from the various transformations of bile, in its progress from a natural state, through all the degrees of inspissation, viscosity, coagulation, and concretion, to the most solid calculi; which have been observed by exposing it to its spontaneous changes in an open vessel, or by gently evaporating it, by what has been discharged from living bodies, and by what has been found in dissections; and all these appearances help to give us some light into the manner of the formation of calculi. Thus Van Swieten * says, that bile, when it is confined and stagnates, soon forms into calculi;

* Comment. in Boerhaav. Aphorism. Cap. de Hepatit. et Icteric. multipl. sect. 950.

calculi ; as he observed in some bile which he had set by in a glass vessel to putrify, finding some little calculous clots at the bottom of the vessel. Sometimes icteric patients have discharged very thick bile, almost as viscid as birdlime ; and many have voided with the excrements large quantities of sandy grit, of various colours, sometimes whitish, at other times reddish like brick-dust, or brown, or black. Which grit has been sometimes seen to cover hard fæces, and to make them so rough as to be painful, or even to excoriate the anus in passing out of the body ; but it much oftener comes away in soft or fluid stools by a salutary diarrhæa ; of which Van Swieten tells a very remarkable instance in an old lady, who had such a flux for six whole months, and not only bore it well, but also grew better with it, and in the end recovered her health. Thus we see in practice, that various other salutary fluxes occur in different diseases, either by the mere kindly efforts of nature, or with some assistance from art ; some of which, it is to be feared, are too often

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officiously and injuriously stopped by art, for want of proper judgment or attention. And I may here also observe, that some patients have suffered in like manner, though seldom to so great a degree, from these fabulous and viscid dregs of bile obstructing and distending the ducts, as when the passages have been stopped by calculi completely formed. But dissections have afforded numberless examples of the gradual degeneracy and coagulation of the bile, before it comes to be formed into perfect calculi. Thus Vesalius, * speaking of the gall-bladder, says. “ It would be
 “ tedious to recite all the different appearances *he* had found in it ; as to the
 “ colour of the bile, whether yellow, or
 “ black as ink, or almost white ; or as to
 “ the consistence of it, whether in a fluid
 “ state, or thickened into the form of soft
 “ clay, or of an ointment made of flour
 “ with honey or turpentine ; or as to the
 “ various forms of its calculi ; or the
 “ bladder being distended by its contents
 “ to the size of two fists, or a total de-
 “ fect

* Exam. Observation. Fallop.

“fect of bile in it. All these things, *he*
 “*says*, had made *him* more solicitous about
 “the nature of this bladder than *he* had
 “been before.” I wish that practitioners
 in general would take this hint, and be-
 come more attentive to the diseases of it.
 The same author, in another * place,
 speaks of this bladder being distended to
 a great bigness, and filled with very mi-
 nute calculi of the size of millet seed, or
 rather with unformed grit, like coarse
 powder of *tutty*, as he compares it, in a
 man who had been many years troubled
 with a jaundice. In the Philosophical †
 Transactions, we have an account of
 stones found in the gall-bladder, and no
 fluid bile along with them, but some that
 was of a solid though soft consistence, and
 of the colour of yellow *ochre*, filled up
 the] interstices between the several stones.
 Hoffman says, he has found bile thick and
 black as pitch ‡. And in another place he

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* Epist. de Rad. Chyn.

† Lowthorp's Abridg. vol. III. p. 81.

‡ Dissert. de bile medicin. & venen. corpor.

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mentions its being like * rob of elder. We read in the Ephemerid. Academ. Natur. Curios. of bile black and incrassated like † rob of cherries ; in another place of its being viscid like frogs spawn ‡, or the white of an egg ; and in another instance its consistence is compared to that of boiled rice §. Thomas Bartholinus || tells of a man that died of a lingering jaundice, in whose gall-bladder there was no proper bile, but some dregs or lees of it, (*amurca*) and a solid lump, like a whitish kind of clay, or potters earth, of the size and shape of the kernel of a large date ; which, says our author with very good reason, if the man had lived, would doubtless have hardened into a perfect calculus. Haller † found viscid bile, partly yellow and partly black, filling up the remainder of the bladder, and adhering to the stones that

* Consultat. Cent. II. & III. Cas. 197.

† Dec. III. Ann. IV. Obs. 86.

‡ Dec. II. Ann. IX. Obs. 9.

§ Cent. I. Obs. 57:

|| Act. Medic. Hafniens. vol. III. Obs. 28.

† Opuscul. Patholog. Hist. IX.

that were in it. And Heister tells † of a stone he found in the gall-bladder of a woman, of the size of a large walnut, of a deep yellow, like *gamboge*, and surrounded with bile of the same colour; but he does not say of what consistence that bile was. The stone, however, was not of a very solid composition, and was probably but newly formed; for by a small pressure it divided into many clots or clayish lumps, some larger and some smaller. Thus the bile is found very different both in colour and consistence. It is sometimes black, sometimes yellow in various degrees, sometimes green, and sometimes very pale, almost white, whether there be any stones in the bladder or not. When there are stones along with the bile, it is frequently of the same colour with the stones; as black with black stones, yellow with the deep yellow, and pale bile with those stones that are of a yellowish white. But this does not always hold, for sometimes the colour of the

† Act. Physic. med. vol. I. Obs. 181.

the bile differs from that of the stones, and sometimes there are stones in a dry bladder, that has no bile at all in it. The pale-coloured bile, is, I think, most frequently found along with stones, as indeed I also think, that the pale-coloured stones are the most common : and that pale bile has generally very little bitterness in it, and sometimes none at all. When the bile is found much thickened, so as to approach towards a solid consistence, whatever the colour of it is, and whether there be already any stones formed in the bladder or not, we may suppose, that such bile proceeded from a calculous disposition in the humours of the body, and would in time have concreted into stones, if it had continued to stagnate, and life had been sufficiently prolonged. But when the bile is only changed in colour, and not in consistence, this may arise from various causes, not easy, and perhaps some of them not possible, to be assigned. Whether the whitish insipid bile be the cause, or the consequence, of the calculi with which it is found, seems hard

hard to say ; as it does also to account for that colour, or for the want of bitterness. To say that such bile abounds more with earthy particles, and less with oily ones, seems not to be a satisfactory account of the matter ; neither is it a proper explanation, if we ascribe it to the constitution, or to the state of the blood. Thus far, I think, we may say in general, that the hotter the constitution and the disease which a patient labours under are, the bile may be expected to be, *cæteris paribus*, the more intense both in its yellow colour and in bitterness ; and the colder the constitution and disease, that the bile should be the more pale, insipid and watery. And accordingly we find in some cachectic cases, and in dropries, that the gall-bladder is often filled with a mere tasteless, almost pellucid serum. But I will not say that this rule is without exception ; and perhaps, or at least so far as I know, the full understanding of the various appearances and properties of the bile, and of calculi, and the exact connection between them, must be

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be referred as a problem to posterity, to be solved only by future inquiries and observations.

Having said thus much in general, about the ingredients of biliary calculi, and the various gradual degeneracies of the bile, from its natural state to the perfect formation of them, we come now to speak of their sensible properties. It has been before observed, that some of these calculi seem to be made almost solely of earthy particles, cemented together, perhaps by a kind of mucus, without any appearance of bile; and that others seem to consist of mere inspissated bile without any mixture of earth, which will be different from one another, according to the bile from which they are formed, whether it was black or yellow, or green, or of some other colour; but that the greater part of them are an undoubted mixture of earthy particles and bile, as both these are plainly seen in the composition. And according to the various proportions of these ingredients, to
their

their more or less intimate union, to the difference of the bile and also of the earthy particles in different constitutions, to the length of time the concretions have remained in the bladder, to the number of them contained in it at the same time, to the degrees of heat in the bodies of different patients, and their way of living, particularly with regard to motion and exercise, which may have a considerable effect on the concretions when first formed and in a soft state; I say, according to the difference in all these respects, and, it may be, of various other circumstances, these concretions will be different in their consistence, specific gravity, hardness, toughness, friability, solubility, inflammability, figure, size, colour, and other properties.

Thus some are very compact and hard, and rather heavy, others are soft, or friable, and light. Many of them may be very easily crushed between the fingers, and some will even fall to pieces

pieces spontaneously in the open air; while others require a strong force to break them, as I have before observed, especially some of the white earthy kind, or as Hoffman says, those of a yellowish red, inclining to black. Ruyfch * speaks of one, which he calls calculus marmoreus. They are for the most part specifically lighter than water, and therefore commonly swim when they are put into it; but there are some few which will immediately sink to the bottom. Bianchi says, the black ones are generally hard and heavy, sinking in water, that they are sometimes harder than urinary stones, and nearly like to pebbles. But Morgagni says, some black ones swim, whereas the urinary stones always sink. Other authors also speak of black ones being light and swimming in water; particularly Fernelius, and that careful observer and judicious practitioner Dr. Huxham, in the history of a dissection which he relates in the
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* Thesaur. Anatom. X. N^o 135.

Philosophical Transactions †. Some of the calculi, which swim at first, will sink after they have been some time in the water, and it has insinuated itself into their pores. And of the greatest part of them, when they are broken to pieces, the fragments will presently sink in water. In most of them there is a difference between the outside and the inside, though some few have both alike, being of the same substance throughout. When there is a difference, the outside is either a crust formed over the rest of the calculus, or a kind of glazing or varnish. The crust is commonly different both in colour and consistence from the inside, is smooth and somewhat shining, and feels greasy or rather soapy. When I say this crust generally covers them, I mean such as are completely formed, have been long in the bladder, and consist of the more common proportions of bile and earthy particles. For as to those, which seem to be almost pure earth, or mere bile, they have not always the crust or even the varnish ;

†Eames and Martyn's Abridgm. vol. VII. p. 519.

nish ; the former being sometimes rough and gritty, the latter soft and gummy. But indeed it is probable, that when they are found thus it is owing to their being newly concreted, and that both sorts might have acquired a crust or varnish by a longer continuance in the bladder. For they vary much through length of time ; and not only the outside, but also the inside, as it hardens and grows dry ; which it does even while they remain in the bladder, but more especially after they are covered over with the crust, the bile then not having any longer so free an access to penetrate to the inside and keep it moist. The inside of some of them consists of distinguishable, and pretty regular strata, which shew the gradual concretion of the bile ; but in others it is a more irregular mass, sometimes of one single colour, and uniform consistence, but often variegated, and sometimes veined like the inside of a nutmeg, or fine *rhubarb*. It is the light friable calculi chiefly that have this polished crust for their exterior lamina ; and
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the more solid hard ones that are covered with the thin glazing or varnish, like what we see in many urinary calculi, and even in those of the intestinal kind. The crust is often full as thick or more so than some of the internal laminæ, and being of a firmer substance, as more earthy, holds the more soft or brittle contents together; which, when they become dry and crumbling, if the crust is broken, fall into small pieces, or into a coarse powder. I have one by me of the size of a small hazle-nut, but of a longer shape, which being broken, its outside is a hollow shell, pretty thick, containing a blackish powder like cinders, or rather like dried blood. But instead of this crust or varnish, there is now and then one found, which has a covering like sparkling crystallized salts. I have seen one of this sort, in a dried gall-bladder, fixed in its position towards the neck of the bladder, just as it was taken out of the body many years ago; which by its external appearance seemed

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as if it consisted wholly of salts. And there is in the Philosophical Transactions† an instance of one beautifully cruſted over with cryſtallized ſalts, of various figures, conical, cubical, pyramidal.

Biliary concretions do not diſſolve in water, even with boiling, though the bile itſelf ſo readily diſſolves and mixes with it. Nor are they ſoluble in a ſpirituſ menſtruum, as neither indeed does the bile diſſolve well in rectified ſpirit, though it does in a weak ſpirit. Hoffman ſays, he has ſeen ſome large and ſoft ones diſſolved to about half their bulk in hot water. Dr. Whytt * informs us, that they will not diſſolve in lime-water, as the urinary calculi do. But we learn from Dr. Hales ‡, that ſome of them will diſſolve in a *lixivium* of ſalt of tartar, which the urinary calculi will not.

Moſt

† Lowthorp's Abridgm. vol. III. p. 159.

* Eſſay on the Virtues of Lime-Water, p. 112.

‡ Statical Eſſays, vol. II. p. 192. Exper. I. N^o 3.

Most of the gall-stones will burn and flame more or less when they are dry, except those whitish gritty ones that seem to be almost all earth. Many of them, especially some of the deeper coloured, will flame like a candle or rosin, and consume almost all away, leaving only a small quantity of a black insipid kind of calx or ashes behind. And if the more earthy ones do not so readily burn to a flame, but rather melt like wax, yet it should seem from one experiment of Hoffman's, with the gall of an ox, that a due proportion of earthy particles, mixed with the bile in the composition of the calculi, increases their inflammable quality. For he found, that pure gall inspissated by evaporation, to the consistence of a resinous extract, would only consume away by burning to about half its bulk ; but by intimately mixing with the bile, when evaporated to a certain degree, a due proportion of the powder of a fat-tish kind of white earth, like potter's clay, or perhaps a kind of fuller's earth, a mass was made of a harder consistence

than the inspissated bile alone; which mass, when dried, would burn like the cystic calculi, and consume away, as they do, to a very small remainder. But as in their other properties, so likewise in this of inflammability, there is a considerable difference; some burning much more freely than others, whether they were formed in the gall-bladder, or in the hepatic duct. Bianchi and Morgagni both agree, that the black ones do not so readily burn as the yellow; and that the black will not continue flaming, but sparkle a little and go out, whereas the yellow will almost consume away; that the black send forth a disagreeable smell like burning hair, while the smell of the yellow is not offensive, but somewhat like that of burning sealing wax. But some of them, both of the black and yellow, burn more freely than others of the same colour. And whereas Bianchi says, the hepatic ones burn better than the cystic; Morgagni found, that most of this last sort burn readily, and he has seen some hepatic calculi, and yellow too,
not

not burn well. And as there is a difference in the calculi of different subjects, so likewise is there sometimes in those of the same; as in Morgagni's instance of an old man, in whose body he found calculi both in the gall-bladder and in the hepatic duct, and observed that even those in the duct differed from each other in experiments both with water and fire; so that, says he, there must be a different composition under the same external appearance and colour.

As to the figure of them, it is extremely various, they being found of almost all shapes that can well be imagined; and it happens but rarely, that two of them are seen exactly alike. They may be said to partake of, or to approach towards, all the regular figures, but not often to come up to any of them. Some are roundish, some oval; most of them are more or less angular, but commonly with great irregularity, many partly round and partly angular; some of them come near to a square, either cubical like a die, or

flat like a lozenge; but both sorts are generally an irregular square, and very seldom a perfect one. Therefore Morgagni * calls them not cubical but cuboide, and though he allows of a great diversity of shapes, yet he seems to make the cuboide the most common of all; insisting against Bianchi, that, whatever others had seen, among those which he himself had met with, the greatest part of them *a figura cuboidæa longissime non aberant*. Of the angular ones, they are spoken of as having from three to twelve angles. But the number and size of the angles, whether more or fewer, more acute or obtuse, are very various and uncertain, as they depend in some measure upon the number and position of the calculi in the gall-bladder or ducts; whether they lie loose and floating in the bile, or are in contact; whether the bladder is more or less full of them, and they are more or less compressed by the coats of it, and pressed against one another while in a soft state,

* Adversar. III. et Epist. I.

state. That they are thus pressed is evident from dissections, as the bladder is sometimes found full and distended with them ; and also from the appearance of the stones themselves, after they are taken out of the bladder, or discharged from living bodies. This pressure doubtless causes them to shoot out into those irregular angles. And the parts where they came into close contact, are plainly seen, either by the impression they make on one another, or by the absence of that external crust, which generally covers the cystic calculus, when it is free from adhesion, and is surrounded by the bile. The pressure of the stones in the bladder will also account for their being partly angular and partly round, which I take to be the most common shape when the bladder is pretty full of them. For those that are next to its sides may on their outside, where they touch the bladder, acquire a roundish shape, and make a larger or smaller portion of a sphere according to their magnitude and position ; while the other parts of them, where they come

into contact, or juxtaposition, with the rest of the calculi, may form into more or fewer angles, and those more acute or obtuse, according to their situation, their larger or smaller contact, and as the bladder is more or less crowded with them. And those which are in the middle of the heap may, by being pressed by the rest, and touching in more or fewer points, or in a larger or smaller part of their surface, be squeezed into all manner of angular shapes, and with little or no convexity. There is a full example to this purpose in the Philosophical Transactions *, by Dr. Tyson. “ The number of stones
 “ was above thirty, of various sizes, from
 “ that of a large nut, or a nutmeg, to a
 “ pepper-corn ; all of them angular ; the
 “ side toward the bladder was convex,
 “ the other two sides were flat ; so that
 “ having the lesser angle towards the
 “ centre of the cavity of the gall-bag,
 “ like so many wedges, they more com-
 “ pletely filled it up.” And probably
 their

* Lowthorp's Abridgm. vol. III. p. 82.

their forming into angles is chiefly, if not wholly, owing to this pressure, and not to any disposition in their ingredients to assume this shape, as salts of different kinds shoot into their proper figures. Accordingly we may observe, that when there is only one, or but a few calculi in the bladder, they are more apt to take a roundish, or an oval shape, and to be but little if at all angular. And when careful and accurate writers, speaking of some particular calculi which they have found, call them triangular, or cubes, or pentagonal, they are not to be understood to mean, that those calculi came up exactly to these perfect figures, but only that they approached nearly to them; except when such an author is very express about the shape in a particular instance. Thus that diligent and curious observer Dr. Simson * tells of one of a prismatic figure, and of another exactly triangular, when all the rest discharged by the same woman were of irregular angles.

* Medic. Essays and Observ. vol. 2.

angles. Hoffman also speaks of some exactly cubical. Therefore Bianchi might have spared many of his unreasonable cavils against Morgagni, about the shape of these calculi, as well as their other properties; and especially as the latter had probably seen more of them, or at least seems to describe those he had seen with much more accuracy than Bianchi himself. Bianchi writes in a warm positive manner, and seems to make the shape of them more regular, and its connection with their colour and other properties more constant and uniform, than they are really found in nature. He denies that they are ever found of some particular figures, which Morgagni and other authors had described, as well as contradicts some of Morgagni's observations about some of their other properties; and for no other reason, so far as appears, but because he had not seen the like himself. Morgagni replies with temper and dignity, not controverting Bianchi's observations which are related as facts, but defending his own, and insisting that his descriptions are right as to those

those calculi he had seen; though he readily admits, that others may have found them different from what he himself had. Those who would see more of this controversy between these two famous professors, may find it in Bianchi's *Historia Hepatica*, tom. I. and in Morgagni's *Epistles*. But besides this description of the shape of these calculi, as approaching to certain regular figures, they are also spoken of as resembling, both in shape and size, several bodies familiarly known; particularly some sorts of seeds, fruits, and the like; such as peas, beans, kidney-beans, nutmegs, hazle-nuts, olives, acorns, chest-nuts, and many other things. Morgagni mentions a single one that he found, of the shape, size, and colour of a mulberry, and granulated like it. Haller* also describes several of this shape. A man who was my patient voided several small roundish ones, granulated in like manner, of a deep yellow colour on the outside, rather whitish within, and pretty soft. The largest of them

* Opuscul. Patholog. Hist. 5, & 7.

them that I saw was not bigger than a pea, and the rest considerably less; but small as they were, they occasioned great pain in passing the duct. Their shape was not much unlike some rough sugar plums made for children, which have the sugar encrusted upon a coriander seed *. Some calculi have been aptly enough compared for their shape to the eight little bones of the wrist. Haller mentions this resemblance. As does also Reverhorstius, who gives the print of just eight § which he found in the gall-bladder of a woman; and he says, their several respective sides did pretty nearly correspond with each other. And perhaps it is not easy to name any thing, to which some of the irregularly angled calculi bear a greater similitude than to these bones, both while they lie in a cluster in the bladder, and after they are separated and taken out, or are discharged from living bodies. Some also have been found in the liver and its ducts

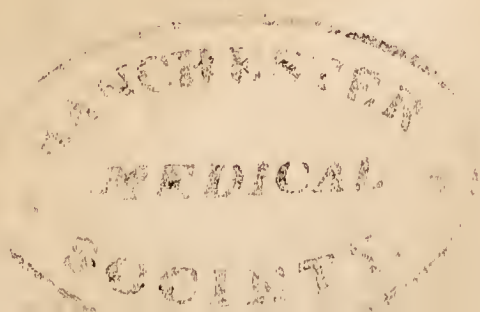
* Bennet describes some that he found in the neck of the gall-bladder of the like shape. *Theat. Tabidor. Exercitat. XX.*

§ *Tabul. II. fig. 2.*

ducts of a long cylindric shape, and some of them branched according to the ramifications of the *porus bilarius*, which therefore have been compared to branches of coral, and sometimes they have been hollow like stony tubes. These indeed are oftener found in brutes, that is, in the horned cattle; but they have also been found in men; and Glisson says, that he has known several men, who have voided fragments of these long stony concretions by stool in large quantities, and that they are of the same nature with those in the gall-bladder. Bianchi says, probably from theory, reckoning by the shape of the duct, that those of the hepatic duct are always of an oblong figure, as the cystic calculi are always roundish; both which Morgagni sufficiently refutes.

The colour of them is also various as well as their figure. Some are whitish, some of the colour of wood-ashes, some yellow, deeper or paler in a great variety of degrees, some brown, greenish, of a lead-colour, black, &c. or of such a mixture

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of several of these colours as is not to be described ; some have irregular spots of a different colour, and some are variegated, or veined like marble. The inside is sometimes of the same colour with the outside, particularly of those that are whitest and most of the stony or earthy kind ; as also of some that are of a deep shining black, or of a dark yellow, or brown. But those which are covered with the yellowish white crust, before mentioned, have commonly their inside of a different colour, either brown or yellow, deeper or paler, and often as it were marbled or veined with a mixture of a saffron colour and other paler ones, sometimes with more and sometimes with less regularity. This is the sort which I have seen most of. And herein my experience agrees with Van Swieten's, who says, that those had occurred most frequently to him, which on their outside have nearly the colour and unctuousity of Venice soap, but being broken, shew a yellow nucleus. Some are black as coal both without and within. Morgagni speaks of such, and
of

of their being light and friable. And Dr. Huxham observed the like in the case I before referred to, but adds, that they had many shining particles in them like salts. Baglivi * found two that were black and hard, but sparkling as if they were a congeries of black crystalized salts. Sometimes they have been found of extraordinary colours; some green as a leek, or like an emerald, some bluish, some like crystal, colourless and transparent †. Schenckius also quotes from Traffelmanni Observationes, an account of Daniel, archbishop of Mentz, who died lethargic, *ann.* 1582, in whom the ductus communis choledochus was distended to a very great bigness, and full of calculi, the largest of which were of the exact shape and colour of nutmegs, and the smaller of a shining lead-colour, so that they appeared precisely like leaden bullets. They were easily broken, were yellow within, and of a bitter taste. Camenicensus ‡ speaks of one in the gall-bladder
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* De Bilis Natura.

† Vid. Kentman. Schenck. Observat. med. Bonet. Sepulchret. Anatom. &c.

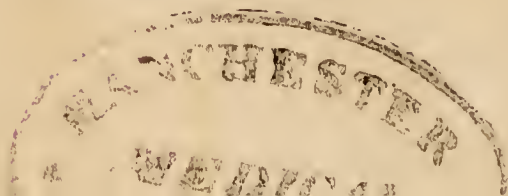
‡ Epistol. ad Matthiol.

of George king of Bohemia, of a reddish colour, which he compares to the *lapis hæmatitis*. And Hoffman tells of some found in one body so nicely polished, and of such beautiful variegated colours, that they were thought fit to be set in rings in the place of jaspers.

The magnitude of these concretions is of all sizes, from that of a pin's head or under, to that of a walnut or above. But the middle sizes are the more common. Those which we see voided are usually from below the size of a pea to that of a hazle-nut. But there are some few discharged that are much larger, some as big as nutmegs or yet bigger. Dr. Musgrave, in the Philosophical Transactions *, tells of one of an oval shape, almost an inch long, and $\frac{7}{10}$ of an inch in its shortest diameter. Van Swieten saw one, that came from a patient of his, as big as the ^{joint}~~top~~ of a man's thumb, and two more from the same person not much less. And Bianchi † tells of one discharged by

* Mott's Abridg. part II. chap. IV. p. 104.

† Histor. Hepat. Part II, Cap. XI. sect. 3.



by a lady which was bigger than a walnut. This is the largest I have met with in any author, except that monstrous one of professor Schacht, as big as a turkey's egg, if that was truly a gall-stone grown to that size in the bladder, and not partly formed in the guts. But in opening bodies they have frequently been found of a large size. Sometimes one single stone has filled the whole bladder. Though this indeed is no proof of a stone being very large. For as the bladder is sometimes greatly distended, so likewise is it sometimes contracted far below its natural size, and the natural size of the bladder also varies greatly in different subjects as well as the shape of it. Thus *Monf. Petit* * tells of a stone no bigger than a nutmeg filling the whole bladder exactly, and adhering so closely to the coats of it as not to leave room for one drop of bile. And in some instances it has been more than an adhesion between the bladder and the stone,

* *Memoires de l'Acad. de Chirurg. tom. I.*

for the bladder seems to have been lost, being petrified and consolidated with the stone into one mass. Ruyfch * found a petrefaction in the inward coat of a bladder, which contained thick bile though no stones. And what can we make of the obliteration of the bladder in that case of Fernelius's old angry man, and in some few instances in other authors, but that it was really petrified? Fabricius Hildanus tells of one very hard stone found alone of the size of a † walnut; and of two in the bladder of another man, one round and the other long, which seem to have been yet larger, or at least one of them, as it appears by the print he ‡ gives of it (for he does not tell its dimensions) to have been of at least an inch and half diameter in bigness, and full twice as long, and though it was spongy, and had cracks in it, and therefore was light in proportion to its bulk, yet it weighed, even after it was dry,

* Observat. Anat. Chirurg. Obs. 31.

† Cent. I. Obser. LX.

‡ Cent. IV. Observ. XLIV.

dry, an ounce and three quarters. But the examples of large stones found in the gall-bladder are so common, that it is needless to quote any more. Bianchi says the calculi of the hepatic duct are always small, but Morgagni says, he has seen the hepatic duct distended to such a degree, as to be capable of containing as large stones as are ordinarily found in the gall-bladder. And Glisson says, that the porus bilarius is sometimes seen six times bigger than usual.

The number of these biliary calculi, varies also extremely in different subjects. They have been found in opening bodies from one single calculus to several hundreds. Platerus* gives an instance of three hundred found in the gall-bladder of an old lady, six of which were as large as nutmegs, and of the rest some were of the size of coriander seeds, and some no bigger than turnip seeds. This number was not small, though it was a matter of

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more

* Observat. lib. 3.

more curiosity than use to count so many minute bodies. But much more surprizing is the instance told by Hoffman †, of a gall-bladder distended to such a length and bigness, as to contain no less than 3646 clots of coagulated bile, some of the size of peas, and some of shot, or small bullets, or something like them, as I suppose he means by the word *globuli*. And many patients have voided them in great numbers, even to some hundreds in the whole ‡. One patient of mine discharged seventy in one day, during the operation of a purge, who also passed some few before that day and some after. It is evident, that in general it is better for a patient to have a great number of small calculi than one very large one, as the chance of getting rid of them is so much better. Though, if they are ever so small, they cannot always be discharged, as appears from the two examples just now recit-

† Dissertat. de Bile medicina & veneno corporis.

‡ Vid. Frewin Epist. in Dissertat. R. Ruffel, M.D. de Ufu Aq. Marin. Vid. etiam Van Swieten, Bianchi, &c.

recited from Platerus and Hoffman, and from many others ; since one of them may effectually stop the duct, so as to confine all the rest in the bladder ; or the bladder may be so distended with them, and have its fibres so stretched, as to close up the opening into the duct. Besides, that a number of stones are often in some sort joined together, and while that union remains, they are in effect as one large stone, and can no more be discharged. But when this union can be dissolved, as it often is, then those which had been joined, come to float in the bile like those which always remained separate and loose in the bladder. This union or adhesion has been sometimes seen in dissections. That which appeared, at first sight, to be one single large stone, has been found by examining to be composed of many small ones, of different shapes and sizes, either lying in contact, or more or less joined together, and perhaps sometimes having one common covering, or thin smooth crust, grown over the whole heap. Schenckius quotes an instance of this sort from

Neretus Neretius, a physician at Florence, in which there were many stones so compacted together, that at first view they seemed to be but one stone. The German Ephemerides † mention a stone which was composed of 130 small ones. In the *Acta Physico-medica* * there is an account of a calculous ball taken out of the gall-bladder, which weighed two ounces, and broke into sixty small pentagonal stones. Whether that case before recited ‡ from Heister comes up full to this point, that is, whether these clots or lumps, into which that stone was easily broken, were so many distinct concretions slightly cohering together, or were so many accidental fragments of one large soft concretion, I shall not determine; as the question is not clear from the short narrative he gives of the case. And it often happens, that these stones touch, or adhere to one another in the bladder, in more or fewer points, when they do not make the appearance

† Dec. II. Ann. IX. p. 466.

* Vol. V. Obs. 129.

‡ Page

pearance of being but one stone. Morgagni, in a letter published in the *Acta Physico-medica* *, speaks of some small ones, of which two or three, or four, or more of them slightly cohered together. A very singular instance is told by Ruyfch†, of a prodigious large compound stone, taken out of the urine-bladder of his own son after his death, formed of six stones each bigger than a nutmeg, united together; and there was a seventh stone of the same size, which lay upon the great compound, but did not adhere to it. But of the biliary calculi, besides what is found by dissection, we often see the evident marks of pressure, or of adhesion in some points, in those that are voided by patients; and can sometimes tell by the impression on one stone, which happens to be first discharged, even though it be of a round or oval shape, that there is one or more behind; and sometimes also observe, when more are come away, that their surfaces correspond with one

I 4 another,

* Vol. II. Obs. 167.

† Thesaur. Anatom. III. lit. K.

another, and shew the contiguous position in which they lay in the bladder. Of the two large ones before mentioned from Fabricius Hildanus, the long one was made so hollow at one end, by the pressure of the other against it, as to be capable of containing a third part of the round one in its cavity*. The manner of this impression or adhesion, is easily conceived from their coming into contact while in a soft state. When, if the crust is fully formed around every stone, there may be only an impression made by the hardest on those which are softer; but if the
crust

* The following curious observation on this head I received in a letter from Dr. Oliver at Bath, since this chapter was written, and here insert it with the doctor's leave.—“ In others I have found the whole cyst
“ quite filled with a conglomerated body resembling
“ a pancreas, and consisting of innumerable small
“ stones compacted together, yet forming one smooth
“ surface, but easily divisible when taken out of the
“ bladder, which is their mould. Many years ago,
“ I took one of those pyriform concretions out of
“ the gall-bladder of an old lady, which was
“ composed of above an hundred small stones, of
“ very irregular figures, each having cavities in
“ which they received the convexities of their
“ neighbours, and *vice versa*.”

crust is not quite formed, they may come to adhere in those parts where it is wanting, and in more or fewer points, as their figures will allow them to come into contact. Or this adhesion may be occasioned by fresh bile coagulating in the bladder, after the first concretions were formed, and filling up the interstices more or less. And if the interstices are filled up, instead of an adhesion in some points, the stones and the new coagulating bile may in time be consolidated into one hard inseparable mass.

Before I finish this chapter, I think it not improper to take notice of another kind of concretions voided also by stool. Which, though they are of a different nature from the biliary ones, yet as they sometimes have a connection with these by deriving their first origin and basis from them, and also may be mistaken for them by those who are not well acquainted with both sorts, I have chosen to speak of here, and to shew the difference between the one sort and the other. These
other

other concretions, which I am to speak of, are the intestinal calculi, or balls formed in the guts; which are commonly roundish or oval, sometimes approaching to cubes, but seldom perfect in their figure, hard to the touch, yet light as to weight, of a size for the most part between one and three inches in diameter, and generally covered with a thin smooth shining crust or glazing. They seem to be composed of the fine fibrous stringy parts of the fæces, closely compacted together, and cemented by the mucus of the guts or other humours, with a mixture, at least in some of them, of fine earthy particles, and formed in layers one above another upon a nucleus or centre commonly of a very different nature from the rest of the calculus. This nucleus is either the stone of a plum, or cherry, or some other fruit, or some little bone, or other solid body swallowed down; or else something formed in the body, either in the guts themselves, or a biliary stone fallen down from the ductus communis choledochus, and lodged in the guts. Any one of these,

these, or other such solid body, being in the guts, and not passing off with the fæces, but remaining there, either fixed at first by some slight adhesion, or having fallen into one of the depending flexures of the colon, or into the cœcum, or being detained by the valves of the colon, may serve as a centre for one of these calculi to be formed upon. For being thus detained in some part of the great guts, where the fæces are grown thick and gross, and move slowly, some of their fibrous parts being exhausted of their juices by the powers of the digesting organs, and become stringy or downy, meeting with a solid body in their passage, are stopped by and adhere to it ; and being gradually collected, are united and compacted together by the mucus, and by the motion of the guts into a coat or crust around the body of the nucleus : which crust grows firmer and drier by degrees, from the warmth and motion of the guts, and having its moisture absorbed, as we see the common mass of fæces does when long detained in the body. One crust or
layer

layer being thus formed, after some very uncertain time, (for we are not to suppose that either these or the biliary or urinary calculi always increase equably in equal times, as the difference in the several strata seems to shew the contrary) another is in like manner gathered, and so on, one layer upon another, till at length the concretion is grown to a very considerable size, sometimes to four, five, six, or more inches in circumference; when, sooner or later, either perhaps by its own weight, or some other cause, being dislodged from the place where it had been fixed, and passing along the course of the guts, sometimes quicker and sometimes slower, meeting with more or fewer stops by the way, it at length descends into the rectum, and from thence, often with very great difficulty and pain, is discharged by the anus.

These concretions are in some patients several in number at the same time, and in others there is only one. They often remain

remain a long time in the body, both before they are dislodged from the part where they were formed and after, sometimes for several years; and generally produce very great disorders, and almost constant ill health; though some few persons have suffered but little from them, and have got rid of them without any very great inconvenience. They occasion violent pains in different parts of the guts, according to their situation, with costiveness and enormous vomitings, returning at times like fits of a colic from other causes. These fits last sometimes a day or two, and sometimes much longer, return at uncertain intervals, and are apt to be brought on by irregularity in diet, especially such as is hard of digestion, or that does not agree well with the constitution, or is sharp or flatulent. Thus in that case, related by Dr. Simson*, of a colic of this kind for six years, it was observed, that oranges, strawberries, peas, any thing sour or hard of digestion, never failed to bring on a fit. Nor is the patient ever
free

* Medical Ess. and Observ. vol. I,

free from danger of a return of the fits upon every little occasion, and even when no particular cause can be assigned; or indeed is he often long free from actual returns, while these concretions remain in the guts, or at least till they are got down to the rectum; when the stimulus no longer moving upwards, the colic-pains and vomitings cease, and are succeeded by great pains within the pelvis, and a severe tenesmus; which continue till the ball can be expelled, either by violent strainings, or, when these are not sufficient, with the assistance of the patients fingers, or sometimes not without the help of instruments. Sometimes indeed it has happened, that these concretions, either from their excessive magnitude, or being too firmly attached to the guts, or situated in a part from whence they could not be discharged, have been of fatal consequence; the patient being worn out with frequent long fits of colic-pains, and almost perpetual vomitings. Thus it happened in that second case of Dr.

C. C.

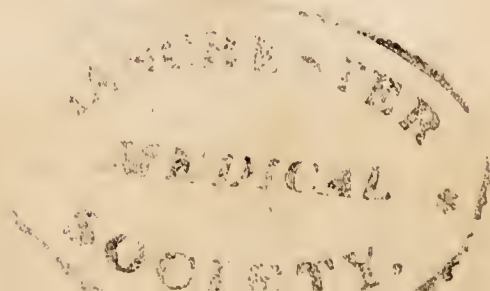
Simson's, which he tells † as an *additamentum* to the former. On opening the body of this patient, two of these calculi were found in the cœcum, one of the size of a hen's egg, the other as large as the egg of a goose. In the latter, near the centre of it, was contained a bit of the broad part of a sheep's rib about as big as the nail of a man's finger. These had caused a hard tumour to be felt externally, which, while the patient was alive, the doctor thought was in the mesentery. And we have an instance, in the *Acta Physico-medica*, vol.V. Obs. 81. of a fatal iliac passion, from one calculus firmly adhering to the gut, and almost entirely filling up the cavity of it in that part. How careful therefore ought all persons to be, not to swallow solid hard bodies, such as plum and cherry-stones, bones, &c. since it may happen, that any one of them may prove the occasion of an intestinal calculus? Or, if they never have any concretions gathered upon them, they may never-

† Medical Ess. and Observ. edit. 4.

vertheless produce very great and even fatal disorders. Binningerus * tells of a man who laboured under continued pains in the belly for three years, and then died. All that time he could take none but liquid food. When the body was opened, the colon was found stuffed with plum and cherry-stones, so closely packed together, that no stools could pass but thin watery ones, which were filtered through the stones. Nor had he voided any other in all that time. Above the stones, which were to the quantity of three pounds in weight, lay forty small leaden bullets, swallowed doubtless with a design to force a passage, though in vain. There are several instances, in the Philosophical Transactions, of very ill consequences from swallowing the stones of fruit, even when they had no calculi formed upon them †. But from how small a cause these intestinal calculi may sometimes take their rise, appears from
a re-

* Cent. 2. Observ. 20.

† See also Medic. Ess. and Obs. vol. V. Artic. 35.



a remarkable story told by Ruyfch, * of a horse in the emperor's stables at Vienna. This creature voided thirty-six calculi in six weeks, being all the time in good health. Ruyfch saw two of them, and breaking one found a single grain of oats in the middle, which served as a nucleus to it.

I will not undertake to lay down any determinate signs, by which it may be always known when the patient's complaints arise from these calculi ; since there are many other causes which may occasion the like disorders. I will not pretend to distinguish with certainty the colic-pains in this case from all other colics arising from other causes ; nor even, perhaps, at all times from a nephritic disorder ; since the symptoms of an intestinal calculus moving down the colon to the rectum may, in some of its stages, greatly resemble those of a stone descending from the kidney, along the course of the ureter, to

* Thesaur. Anatom. II. pag. 39.

the bladder. But in all colics that are long and obstinate, or that have returned often in the same manner, and the proper cause of them does not appear, it should always be remembered, that these intestinal calculi are one possible cause of such disorders. And there seems to be some signs, by which we may be led to suppose that they are actually the cause in particular cases. Which signs are, that the pain has remained fixed to one place for some time, probably during the whole fit, or, it may be, many fits; that when the pain has changed place, it has still followed the course of the colon; that the colic-pains have returned often, when there has been no apparent cause of their return, unless perhaps sometimes an error in diet of some particular kind, which indeed we often see bring on other colics where there is no suspicion of calculi; that there are no signs of inflammation; nor any signs of biliary obstructions, which the situation and manner of the pain, together with the colour of the skin of the stools and urine, will usually determine,

mine, nor of any calculous disposition in the urinary passages, nor of a constitution much subject to nervous disorders; that the fits have often gone off easier than other colics from obstructed bowels generally do, either without any assistance at all, or by the help of some gentle means just to open the body, without making a sensible discharge of any thing, which might be supposed to have been a sufficient cause of so great a disorder; and that when the pains have changed their place, following the course of the colon, they have seemed to fix again at one or other of the flexures of that gut, and especially if there has at the same time appeared a swelling or hardness in that part. When all or most of these circumstances concur, we may have pretty good reason to suppose, that the disorder arises from one or more of these intestinal calculi. And if we can add to these signs, that after the pain has run the course of the colon, in a longer or shorter time, the patient having sometimes suffered innumerable fits, a sudden swelling appears towards

the lower part of the abdomen, on the left side, which after some time goes off, and is succeeded by a pain and weight in the back part of the pelvis, attended with a strong tenesmus, and at the same time the former pains and vomitings are ceased, we may pretty well conclude what we have to expect, before the obstructing body is expelled, or even come within reach to be felt by the finger. But it must be observed, that this swelling is not always to be expected; for unless the calculi are very large, or numerous and falling down together, they may happen to pass this flexure of the colon, without causing any swelling, or being at all perceived there.

As to any method of cure in these cases I know of none that is particularly established; for the case does but seldom occur, and has still more rarely been known when it has happened; and the expulsion of the calculi has generally been owing to the mere efforts of nature, or to these joined with some accidental assistance

ance from art, which was intended for other purposes. Thus it fell out in that case of Dr. Simson's beforementioned, where, upon finding the girl vomiting a great deal of bile of a deep colour, after he had given up the case as desperate, having been disappointed in the use of all the medicines he thought most proper, and resolved to give no more, he came to suspect, that the abundance of that sharp bile might be the cause of her disorder. With a view therefore to dilute and evacuate this bile, he advised, that she should drink a large quantity of warm water ; which, says the doctor, proved a cure, though in a different manner from what he expected. For after she had vomited five or six times, having drank as many pints of water or more, she had a motion to stool; and with a large quantity of fæces voided a ball four inches in circumference and of the weight of five drams. This ball had in the middle of it a plum-stone for its nucleus. The doctor concludes, from the circumstances of the case, that the plum-stone had been

lodged in the guts for six years, gathering the crust around it, and had been the cause of all the colic-fits the patient had suffered in all that time.

We may say in general about a cure, when the cause of the disorder is suspected, that the intentions will be nearly the same, as in another colic from a constipation of the bowels by hardened fæces; and that whatever has a tendency to dislodge any solid body detained in the cavity of the guts, and to propel it downwards in order to its being discharged out of the body, is proper in this case. Of this sort are purges, vomits, (which by shaking may help to dislodge) clysters, fomentations, warm baths, soft oily lubricating medicines used both internally and externally, drinking large quantities of warm water or other soft relaxing drinks, &c. These have all been useful at times, and have all failed in their turns; as it happens in other diseases, one remedy succeeding with one patient, and another with another. And which ever of them
has

has been used just before a calculus was voided has got the credit of the cure for that time, although the same remedy had been often tried in vain in other like cases, or perhaps in the former part of the same patient's case, while the ball was more firmly fixed, and could not then be dislodged. So the warm water seemed to perform the cure in the case above recited. As did a single dose of *jalap* in a case of long standing, which we read of in the Philosophical Transactions*. And Benivenius† tells of one of these balls being brought away by fomenting the belly, after many purges and clysters had been tried in vain. Nor can it be denied, that many of these remedies, or even all of them, may be judiciously applied for a considerable time to no purpose, and at last the balls, which had for a long time obstructed the guts, and tormented the patient, may be dislodged and expelled, either by some accident, or by the mere efforts of nature, without any assistance from art,

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and

* Mott's Abridg. part II. pag. 101.

† Observat. cap. 19.

and at a time when it was not at all expected. A remarkable case of this sort is related in a Latin Epistle to Dr. Daniel Turner, published in 1731, without a name, but written by the late Dr. Robert Porter, as I was informed by his brother Dr. John Porter, from whom I had the letter. The case at first was judged to be a fit of the nervous colic, and treated as such with appearance of success. But afterwards, upon a change of symptoms, it was taken to be a calculous case, and it was thought that a stone was actually passing from the kidney to the bladder; which, from the description he gives, it did very much resemble. After some days, the complaints wearing off, the patient seemed to be growing well; only now there was found a weight near the bladder, which was concluded to be from the stone got down so low in the ureter. But after some time the patient, having a sudden motion to stool, found the weight increase, with a violent pain in the middle of the rectum; and after enormous straining with most racking torture, being in
cold

cold sweats and almost fainting, yet not able to discharge any thing, she found that a solid body was come down within the reach of her finger ; which by continuing to strain, and assisting with her thumb and finger, she at length voided along with the fœces that had been confined by it. This solid body was an oblong calculus, which the doctor, after viewing its inside, reckoned to be of the intestinal kind, with a small biliary one for its nucleus, and therefore an instance of both these sorts of concretions united in one. And that the large calculus of professor Schacht, spoken of in the preface, was of this double kind, I have there given some probable reasons to suppose. A pretty extraordinary case likewise happened within my knowledge many years ago, an account of which I shall here transcribe from the history which I then wrote of it. In November 1726, I saw four large intestinal calculi, which within a few days had been discharged from a lad about eighteen years of age, and also saw the young man at the same time.

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Two of them were expelled, with great pain and straining, along with the fæces ; but the other two were so large, that they could not pass without the assistance of a surgeon. The largest when it first came away was six inches in circumference, and weighed two ounces. The surface of some of them was a sort of stony crust, thin indeed, but hard and polished ; which gave them somewhat of the appearance of some kinds of stones of the urine-bladder. But when they were cut asunder, their substance was found to be composed of several fibrous strata, with a bone in the middle for a nucleus. The boy had been of a strong and healthful constitution till he was twelve or thirteen years old, had a great appetite, and devoured his food very greedily ; and more especially animal food, which he was particularly fond of, but being poor he did not often meet with, unless some of the coarser sorts of it. When he eat any sheep's feet, he used often to swallow some of the little bones ; and either these, or some bits of other bones which he in
like

like manner swallowed with the flesh, were the nuclei upon which these calculi were formed. About five or six years ago he began to be troubled with pains in his belly ; for which he took many medicines to no purpose. Besides the pains he frequently had violent vomitings. Thus he continued for a long while, sometimes better and sometimes worse. And all this time he was very little nourished by his food, and hardly grew at all ; so that he was very near as big at twelve or thirteen years old as he is now at eighteen. The pains and vomitings at length ceasing, he found a large swelling in the left side of the belly near to the os ilium, that is about the great flexure of the colon, just before it descends into the rectum. After this swelling had continued a good while, he was suddenly seized with a violent tenesmus. This lasted two or three days ; when, not being able to discharge any thing, he introduced his finger up the anus, and found a hard body sticking there ; which neither by hard straining, nor with the assistance of his fingers ; could he get rid of,

of, but was forced to have it extracted with a forceps. After this was brought away, another came down to the same place; and thus they followed one another, (the swelling on the left side lessening gradually as every calculus came down) till in the space of four or five days, they were all removed and discharged, either by the force of the expelling organs, or with the help of his fingers or of instruments. The lad seems now pretty well, the swelling of the left side is quite gone, and he has no complaints, only of a soreness of the anus still remaining from the violent stretching of that part. I afterwards understood, that he continued healthy, and grew a strong young man. At another time I saw a larger calculus than any of these, which was voided by a girl of nine years old. It had produced much the same symptoms with those in the lad, only less violent, and for a much shorter time. But when it came to the anus, it occasioned most violent agonies and strugglings to the poor child, which I was a witness of, as I happened
to

be in the room when it was voided. This was of a more soft and spongy substance than those of the boy, and therefore might yield somewhat in its shape to the compressing force as it passed; otherwise it did not seem likely that so large a body could have been excluded from such a child without the help of instruments. It had for its nucleus a large plum-stone. Thus much I have thought fit to say of these intestinal calculi, for the sake of such of my readers as may not be acquainted with them, either from practice or books; and I have endeavoured to give a fuller account of them, and of the disorders occasioned by them, than is to be found in any other author so far as I know. Whoever desires to see more examples may find several in the Philosophical Transactions, in the Ephemerides Germanicæ, in Schenckius's Collection of Observations, and here and there one among the observations of particular writers*.

C H A P.

* See also some histories of these intestinal concretions by that careful and accurate observer, and excellent professor Dr. Alexander Monro senior, in the 2d volume of Essays and Observations Physical and Literary, published by a society at Edinburgh in 1756, since this chapter was written.

C H A P. III.

Of the SIGNS of BILIARY CONCRETIONS.

THE Signs of these concretions are either while they remain in the gall-bladder, or when they are passing through the ducts into the duodenum. I shall first treat of the latter.

The ordinary signs of them, when they are making their way through the ducts, are as follow:

The patient is seized with a sudden, violent, somewhat deep-seated pain, either at the pit of the stomach, or more inclining to the right side, which is sometimes more constant, but for the most part has exacerbations and remissions, in the manner of labour-pains; and this without fever, or any appearance of inflammation, and without any other evident cause exclusive of these calculi. The pain is commonly attended with great sickness and vomiting, with faintness, shortness

shortness of breath, great restlessness and anxiety. There is also generally (if the obstruction continues any time) a costiveness, which is often very obstinate, with whitish stools, resembling some kinds of clay, both in colour and tenacity; the urine, though sometimes very pale at first, as if from a nervous cause, usually becomes of a deep yellow as if tinctured with saffron; and a jaundice-colour appears in the skin, first in the whites of the eyes, then all over the body, sometimes sooner and sometimes later, after the pain begins.

These symptoms usually continue till the stone is passed into the gut, and then go off, that is the pain, vomiting, &c. and many times too as suddenly as they came on. The jaundice indeed must have time to wear off by degrees; as must also the soreness of the parts which generally succeeds the pain for a while, as is common upon the going off of colics, or other painful disorders. It is almost needless to add, that the patients recovering from the great weakness, which a
severe

severe fit often brings on, must likewise be the work of time.

Besides these usual signs, there are some others that sometimes occur; which, though far from being decisive of themselves, especially as they may arise from other causes, yet, when joined with the symptoms above recited, may help to give some light into the case. Thus, for the most part, these patients cannot bear to lie on the left side, which is not to be wondered at, and is a circumstance that attends many other diseases affecting the right side. In like manner they can very seldom bear an erect posture, but find themselves easier by stooping, whether they sit, stand, or walk; nay, and even when they lie on the right side, they often cannot bear to lie strait, but are obliged to bend the body, and lie with the head low on that side. The pain is also increased by coughing or sneezing. All which happen in some colics, and in other diseases of the abdomen. Sometimes a pain is felt in the shoulder and arm on the right side. Sometimes the
pain

pain at the pit of the stomach seems to strike directly through the body to the back. And sometimes not only the pit of the stomach (the part most usually described by patients as the seat of the disorder, and principally complained of, especially in the beginning of the case) but also all the epigastric region, the right hypochondrium, and even the whole belly, come to be affected with pain, or tension, or both; which may happen either by consent of parts, from the communication of nerves, or from a disturbance in the functions of the several viscera, and in the motion of the blood through them, for want of a due circulation and secretion in the liver, and a regular excretion from it; or else from wind, which is often very remarkably troublesome in these cases, even to such a degree, that I have known the patient complain as much of it as of any one circumstance of the case, except only the excessive violence of the pain.

It is also to be observed, that even those usual signs first mentioned do not happen

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precisely

precisely alike in all persons; but will be found to vary in different patients, and even in the same person at different times, as well as to the number of the symptoms, as the degrees of them, and the order in which they come on. Which variations will arise from several causes, (in like manner as we see happens in other diseases) according to the difference of constitutions, and other circumstances, and according to the size and shape, and perhaps other properties of the calculi, as also of the ducts through which they are to pass. From which variation of the symptoms there sometimes arises an obscurity and uncertainty in judging of particular cases. So that we may have good reason to suspect, that the disorder is occasioned by a stone, though we cannot be clear enough to pronounce that it is so; which at other times we can do with sufficient certainty. Thus, if in a particular constitution, from whatever cause, the pains are not as usual, (and I have known stones of a considerable size voided with very little pain) we may be at some loss to determine the cause of

the jaundice, till we find the stones come away. And on the other hand, while there is no appearance of a jaundice, either in the skin, urine or stools, as is sometimes the case for a good while after the pains come on, or even during the whole fit if it be a short one, we may hesitate about the cause of the pains; unless the situation, degree, and the manner of them are so very clear, (and I think they sometimes are so) as to put the case beyond all doubt. But this state of ambiguity, in some particular cases, is no more than what happens with regard to stones in the urinary passages, and many other internal disorders; when some of the symptoms are unusual, or do not well correspond with the rest. For as in the more uncommon and less known diseases, some particular cases may be so strong and clear as to be sufficiently obvious; so in some of the most evident diseases, which are readily known at first view, when the train of symptoms is regular and uniform, we sometimes meet with so great irregularity, and such a perplexed combination of circumstances,

that we are at a loss to unravel them, and find some difficulty in determining a case. We should therefore be ready to own obscurities, and to caution against them, and ought to speak of diseases as we find them, not endeavouring to describe them with more regularity and certainty than they really appear with; otherwise we deceive our readers, by substituting theory for facts, and exhibiting our own imaginations instead of a just representation of nature in the genuine history of diseases. And if we duly attend to all the circumstances, and only make the same allowance for irregularities here, as we do in other diseases, we shall find the diagnostic signs of biliary concretions not less determinate, than those of many other inward disorders, which are supposed to be well known; and especially in such patients as have had frequent returns of the jaundice; which is allowed to be a sign of stones by many authors, even by some who seem to have known very little about any other signs of them, and still less about their discharge and cure.

There is no doubt, but this case will be sometimes more obscure in the first fit than in subsequent ones, as it happens also in cases of the urinary calculi; but both may often be clearly known the first time a patient is attacked with them, and many times those of the biliary kind with no less certainty than those of the urinary passages.

The pain is for the most part extremely acute, as violent perhaps as any the human body is naturally subject to. It sometimes occasions fainting, often strong convulsions, and sometimes, in the very height of the paroxysm, takes away the senses for a short time. Of this I saw a remarkable instance in a woman under one of these fits, of which she had had many before. She was constantly uneasy, but, upon the coming on of every fresh pain, she began to groan and cry out, which she continued to do till it was increased to its utmost extremity; when, instead of complaining, she sung, as one who did not know what she did, for per-

haps half a minute or more, and then, the pain abating, she came to herself.

All the women I have seen in this disease, (and it has so happened that I have met with it in many women to one man) have compared the pains of it to those of labour, but agreed unanimously that they are more violent than labour-pains. And it is no wonder these pains should be thus compared, as they come on and go off in like manner, with some intervals of ease, or at least there are great remissions of the pain, if the patients are not wholly at ease; and as they are owing to a similar cause, namely, that the parts are to be gradually stretched for expulsion in both cases; because in neither of them could the strength of nature hold out, if the pain was to be continued long enough for the dilatation to be made all at once. Nor, indeed, though mankind are very apt to reckon the present pain the greatest, does it seem at all unlikely, that the pains arising from the passing of a stone from the gall-bladder to the gut should exceed the ordinary

ordinary labour-pains ; since one is a natural case, the other a preternatural and morbid one ; and as the parts formed for the exclusion of a child are more adapted for the necessary distention, than either the cystic, or even the common duct is to give way for the expulsion of a large calculus. The pain must necessarily be supposed to be very great, if we consider the slender neck of the bladder, and its cavity still lessened by the valves it contains ; the winding * intorted shape of the cystic duct at its first coming out of the bladder ; the small diameter even of the common duct, especially at its opening into the gut ; and the impediments to dilatation from the density and firmness of the coats, both of the neck of the bladder, and of the ducts, as also from the long passage of the common duct between the several coats of the gut before it opens into it. The circumstances of a stone passing from the kidneys along the ureter to the bladder are very similar to these ; as there also the fibres are to

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* Vid. Ruysch Epist. V. Tab. 5. & Reverhorst, Tab. I. Fig. 2. & Tab. II. Fig. 4.

be stretched by successive pains, and the cavity of the ureter to be enlarged by degrees, and as the ureter also passes obliquely between the coats of the bladder, before it opens into it. The natural diameter both of the biliary duct and of the ureter is very small; but to what degree each of them is capable of being distended is hard to say. Both have transmitted stones of very considerable sizes, and both have been found very large in bodies that had been long afflicted with stones of either kind. Morgagni in *Epist. anatom. jma* speaks of his finding the biliary ducts distended to an immense size. The orifice also of the duct at its opening into the duodenum, which is naturally so very small, has in some bodies been found so dilated by the passing of stones through it, as to be large enough to receive easily the top of the little finger*. How large the utmost distention had been in these subjects during life cannot be

* *Act Physico-medic. vol. I. Observ. 181. ab Heistero communicat. Memoir de l'Acad. Royale des Sciences pour l'Ann. 1701. pag. 193 ad. 195.*

be said; but as in its most collapsed state, after the death of the patients, and perhaps long after the passing of any stone, it was not contracted to a smaller size, we may readily conceive, that pretty large stones had found their way through it, and that small ones might have passed with little or no trouble. And that the ureters have been found distended to a large size, is well known. Van Swieten * says, he has found the ureter of a man capable of admitting the fore finger. And Fernelius § speaks of it as a common thing, in bodies that had long suffered under nephritic complaints, to find the ureters large enough to receive the biggest finger. Through such ureters, he says, middling stones had passed without trouble, whereas in the first attacks of the disease the smallest stones occasioned very great torment.

But though the pains are, perhaps, the most pathognomonic sign, or at least without them we cannot well determine
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* Comment. in Boerhaav. aphorism. vol. III. p. 135.

§ Patholog. lib. VI. cap. 12.

the case, because there may be a jaundice without stones in the duct, or even in the bladder itself; yet at the same time it must be owned, that the pains alone will often be an uncertain sign, unless we also take the other circumstances of the case into the account. Who can at all times be sure of a stone in the ureter, especially in the first fit, from the single circumstance of pain? Or who can always pronounce, that there is a stone in the urine-bladder, merely from the pain which the patient feels in that part? What wonder then, if we cannot always ascertain an obstruction in the biliary ducts by the pain only, without regard to the colour of the skin, of the urine, and of the stools? The white colour of the stools is usually reckoned a very material circumstance; and indeed it is so. But neither is the colour of the stools alone by any means a conclusive sign whether there is any stone or not; because they may be tinged yellow even when there is a stone in the duct, if the stone does not so exactly fill it, but that some bile may pass by, either

ther in its natural course, or being squeezed through by the violent vomitings; and on the other hand, there may be white stools when there is no stone. This may happen from any cause that obstructs the duct for a while, as we see in some jaundices from viscidities or from inflammation, where the issue of the case satisfies us that there was no stone; or it may happen also from various causes, by which all passage through the duct is entirely destroyed, such as a schirrus * in the duodenum obliterating the orifice of the duct, or from the sides of the duct being † grown together, and the like. Though indeed, as these last mentioned causes are permanent, the effects of them will be so too; and therefore such cases will be very different from the temporary obstruction of a single fit of a stone in the duct. But the most extraordinary case of white costive stools is to see them without any other symptoms

* See Dr. Simson's Essay on the Jaundice, Medic. Essays, &c. vol. I. Edit. 4.

† Medic. Essays, &c. vol. II. art. 21. Camenicens. Epist. ad Matthiol. Vid. etiam casum apud Mead Monit. & precept. Medic. Cap. de Ictero.

toms of a jaundice, which has sometimes, though rarely, happened. When it does happen, it seems to be owing to the bile being detained in the bladder, either from such a state of the coats of the bladder, that all its pores and vessels are stopped up as well as the duct, or from such a viscosity of the bile, that it cannot make its way into the blood any more than through the duct; or else to such a degeneracy of the bile, that it has lost its yellowness, and therefore cannot tinge the stools if it does pass the duct, or the skin and urine if it regurgitates into the blood. There is in the *Edinburgh Medical Essays* * a very extraordinary case of a large distention of the gall-bladder in a boy of twelve years old, so as that it contained eight pounds of thick bile. The stools had been white, but no other signs of a jaundice; the bile neither passing by the duct, nor yet, for reasons there assigned, regurgitating into the blood. Several authors speak of bile so degenerated, that it had lost its colour

* Vol. 2. art. 30.

colour and bitterness ; or at least of such a fluid in the gall-bladder, if they do not chuse to call it bile. We have before taken notice of this*, and shall here only mention two or three more instances. Glisson † tells of a cachectic woman, in whose gall-bladder he found *humorem serosum pallidiusculum, minime amarescentem, sed insipidum potius dulcique proximum*. This woman might well appear cachectic, as there was no good cystic bile to assist in the offices of digestion ; and perhaps too that pale insipid serous fluid might in some measure regurgitate from the gall-bladder into the blood, and increase the pale colour of her skin. And Bennet† found the gall-bladder full of a pellucid insipid serum, which, being tried by the heat of fire, was concreted like the white of an egg. There were calculi in this bladder ; whether there were any in that which Glisson speaks of we are not told. It may here also be observed, that there is sometimes a white viscid fluid in the bladder

* Pag. 90, &c.

† Anatom. Hepat. cap. 39.

† Theat. Tabidor. Exercitat. xx

bladder and cystic duct, when the hepatic duct contains yellow bile§.

It appears from what has been said, that we are not to judge of a stone in the duct from one single symptom, unless, as was before mentioned, the pains are so very uniform and distinguishable, even before the jaundice comes on, that they cannot be supposed to proceed from any other cause. But when we find both the pain and jaundice and all the other symptoms regularly corresponding, we can hardly be mistaken in the case.

The duration of the patients complaints is uncertain, sometimes longer and sometimes shorter, as the stones make their way quicker or slower. If there is but one stone, and that not large, and the duct yields pretty easily, the fit may be over in a few hours. It may likewise happen so when there are several small stones to pass, if they succeed one another

§ Vid. Bonet. sepulch. Anatom. lib. III. sect. 21. Tit. de Ventris tumore p. 387. Observ. 4. Haller. Opuscul. Patholog. Observ. 14.

another while the parts remain dilated by the first. On the other hand, I have known a fit last several days before any passage could be obtained, even when there were not many stones, nor any large ones, to come away. A stone is large or small in proportion to the duct through which it is to pass. That may be large to one patient, and come away with great difficulty, after having been many days, or perhaps many weeks, in dilating the duct, or may cause a total and final obstruction, which in another patient, whose ducts have been enlarged by frequent fits, would pass with little or no difficulty, and perhaps occasion no fit at all, or even not be felt in the passage. In like manner a number of stones may pass in one fit with less pain, and in less time, than a single one in another. Sometimes they follow one another pretty quick, so that a large number shall be discharged in one day; and yet there may be a few more left behind in the bladder, which may continue the symptoms at times for several days or weeks, (the patient remaining out of order the whole time

time) one stone falling down now and then into the duct till they are all passed: or sometimes the disorder may go quite off, and the patient become well, while there are yet some stones remaining, to bring on another or more fits at very uncertain intervals of time. The fit may be said to be over when all the stones for that time have entered the duodenum; from whence they usually pass unperceived out of the body, except when they are very large, and then they sometimes occasion the same symptoms as the intestinal calculi before mentioned. Some patients have found such a sensation at the time the stone passed out of the duct, that they have thought something broke within them; others, that something fell down within them; and some have felt as if there was water flowing. In these last, probably there was a large quantity of bile dammed up in the bladder, which, when the obstruction was removed, flowed down apace; as we know sometimes it does by its occasioning a hasty bilious diarrhæa. When the fit is over, the patient is well, for the present at least, except

cept, as before said, the forenefs and weakness occasioned by the pain ; which we find in like manner after a severe fit of one or more ftones passing through the ureter, or after a colic, and in all these cafes must have time to wear off. If all the ftones happen to be discharged, the patient may poffibly have but one fit, and remain free all his life time after ; fuch a change in the constitution being brought about as takes away the difpofition to breed more. One patient of mine, who almost twenty years ago had a very severe fit, and passed several biliary concretions of different kinds, has never had any return of those complaints in all this time. Thus we often see patients have a jaundice from viscid bile without any ftones, which being at once discharged either by vomiting or by stool, or both, the disease goes off, and perhaps never returns any more. But while any ftones are left behind of fuch a size as can enter the duct, or the difpofition to breed them continues, the patient is liable to fucceffive fits at longer or fhorter intervals ; sometimes in

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the space of a few weeks, sometimes after two or three months, or it may be at the distance of a year or two or more. If the fit returns soon, without doubt there were some stones left at the going off of the former ; but when the intervals are very long, and the stones small, and not very hard, it is as probable that fresh ones have been concremented. Another patient of mine, who voided perhaps eighty or more in a fortnight, had a second fit within two months, when three or four came away ; and in another fit, four months after the second, a few more were discharged : since which time, now several years ago, she has continued free from all symptoms of this kind. The man, who voided those small granulated calculi mentioned pag. 107, remained well for almost a year, and then was attacked with another fit, probably from new concretions formed in that time. He would not be prevailed upon to try any course of medicines to prevent a return, though he was warned of it.

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While there are any stones in the gall-bladder, of such a size as can enter the duct, a fit may be brought on by many causes; particularly by violent agitations either of body or mind; though indeed a fit often happens when no apparent cause can be assigned for it. But any strong exercise, or a sudden shock affecting the whole body in general, or the liver and its contiguous parts in particular, may easily be conceived capable of bringing a stone down from the bladder into the duct: which may also happen from violent passions of the mind, especially from anger; because that passion not only puts the whole body into disorder, but, as all authors agree, has a great and singular influence upon the bile and its passages. And since a fit may be occasioned by passions of the mind, this may be one reason, why the pains, and the jaundice consequent upon them, have been imputed to nervous spasms as their proximate, or as their only, cause. Whereas, when the spasms are indeed the cause, and not the effect of stones already lodg-

ed in the duct; it is much more likely, that they should act only as a remote or secondary cause, by shaking the duodenum and ducts so as to force down a stone from the bladder, (which will clearly account for the jaundice and all the symptoms) than that the spasms alone should compress and stop the duct so completely, and for such a continuance, as to bring on a jaundice.

I said in the general description of the signs, that they are without fever, or any appearance of inflammation; because these do not properly belong to the case, nor usually attend it, any more than they do the pains of labour, or a fit of the stone passing the ureter. I have often wondered to find patients in such exquisite torture with so quiet a pulse, and so little of a fever; which I have sometimes thought to be less in this case, than we ordinarily meet with from a severe fit of the stone in the urinary passages. Sometimes, indeed, the pain and irritation may be so great, as to occasion both
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fever and inflammation in either of these cases, and also in labour too: as on the other hand, in some persons, whose fibres are lax and easily extended, a passage is made with little pain for the exclusion of both sorts of stones, and likewise for the birth of a child. And when an inflammation and fever attend, they may so perplex the case during their continuance, as that the calculi may not be known to be the cause.

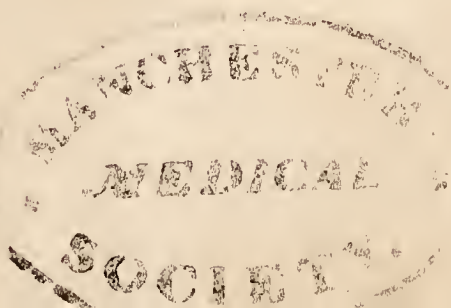
An inflammation and fever may also be accidentally joined with stones in the gall-bladder, when there are none fallen into the duct. Thus it happened to one of the two patients, whose histories are related by Dr. Frewin*, as it has also to many others; and these stones have often been extracted, or discharged with the pus †, from an abscess in the liver,

Vid. Ejus Epist. in Dissertat. R. Russel, M. D. de usu Aq. marin. See also Medic. Essays and Observ. vol. II. art. 29.

†Voyes Memoir. de l'Acad. royale de Chirurg. tom. I. vid. etiam Stalpart. Vander. Wiel. Cent. I. Obs. 45. Ephemerid. Academ. natur. curios. pluribus in locis.

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which has communicated with the gall-bladder, and, by an adhesion of the peritonæum, made its way to the external teguments, and either broke of itself or been opened by art. In opening the body of that lady mentioned by Dr. Frewin there was found an abscess in the liver, and the gall-bladder contained fix stones of the size of a nutmeg. She doubtless died of the inflammation and abscess, as many have done who never had any biliary stones. Those in her bladder had probably been there for a long time, as she had for many years been troubled with violent and frequent returns of colic-pains ; though she never had any appearance of the jaundice, either formerly from the stones, or at last from the fever and inflammation. Nor would a mere inflammation, in any of the parts contiguous to the seat of our disorder, occasion all the train of symptoms, and in the same manner as above described. If it was in the liver itself, but did not extend either to the ducts or ligaments, though it might be attended with an
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high fever, and come to an abscess, or a mortification, and end in death, yet it would not occasion such acute pain; because the liver, being of a loose texture, has not that exquisite sense, which is found in the ducts, and in such other parts of the body, as are more nervous, or composed of more solid and tense fibres; nor probably would it bring on a jaundice, since it is well known, there are numberless instances of suppurated livers without any appearance of it. And supposing the inflammation to reach the ducts, though the pain might be violent, yet it would be constant, without those intermissions which happen when a stone is passing the duct, and attended with an high continued fever. In like manner, if the stomach be inflamed, the pain will be very acute, but it will be continued, with most intense fever, enormous thirst, and vomiting up of every thing as soon as it gets down. So also in an inflammation of the pylorus, or of the duodenum, or of that part of the colon which is contiguous to the stomach, the

symptoms will be nearly the same as in that of the stomach; allowing some difference for the different structure, position, and function of the several parts; but the constant fixed pain, the continued high fever, with a quick, strong hard pulse, as in a pleurisy, will be alike in all in proportion to the degree of inflammation, and will remain the same, till either the disease begins to abate, and to go off by resolution, or till an abscess is formed, or, which much oftener happens, till a mortification is begun. And thus will an inflammation in these parts be distinguished from the symptoms of a stone in the biliary ducts. In two of these parts, namely the duodenum and the duct, an inflammation may be attended with a jaundice also as well as pain. This can hardly fail to happen when the inflammation continues long enough; if either the duodenum is so distended, as to stop the orifice of the duct, or strongly compress the duct itself in its passage between the coats of the gut; or if the coats of the duct itself are so thickened,

ened, as to press the sides together and fill up the cavity : because on either of these suppositions the bile will be quite stopped in its natural course, and therefore must regurgitate into the mass of blood. Whereas an inflammation in the stomach, or colon, being single or merely confined to one part, (for we often find two or more contiguous parts concerned in an internal inflammation, and not seldom adhering to one another) has nothing properly to do with a jaundice ; unless the distention of the inflamed part is so very extraordinary as to make a great compression on the biliary duct ; since we have seen, that even the liver itself may be inflamed and suppurated, in its parts remote from the ducts, without occasioning any appearance of a jaundice. And when a jaundice does happen from an inflammation, it is still to be distinguished from that which proceeds merely from stones obstructing the duct, by the constancy of the pain, and also by the acute continued fever ; since, as has been before said, though a fever
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may supervene, and be mixed with a calculous case, yet it is not a genuine and ordinary concomitant of it.

But, besides fever and inflammation, I excepted likewise any other evident causes, which might be supposed to bring on such symptoms exclusive of calculi. There are two other causes mentioned by authors, as being capable of producing effects like those I have described as the signs of calculi obstructing the ducts; namely, poisons, whether taken inwardly or received by venemous bites, and nervous spasms. But it should seem, that the effects of these may be distinguished from the case of calculi, by the absence of some of our symptoms, or the concurrence of some other circumstances; by knowing the history of what has happened to the patient, or inquiring carefully into the constitution, or by some other characteristics that will attend.

Thus, if poison has been taken, which has produced pain equal in degree to that
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from a stone in the biliary duct, yet the pain will be different, as being more constant, and of a more burning kind; nor will it be so much confined to the same part; but, unless present death ensues from the largeness of the dose, will descend lower, affecting the guts as well as the stomach. The vomiting will also be more frequent and violent, and what is thrown up will usually distinguish the cause; if not by some of the poison discerned in it, yet by the slime and blood mixed with it; as will likewise the stools from the same mixtures in them. And as to a jaundice, it is not, I think, pretended, that this is very often occasioned by poison taken inwardly. Moreover, the other symptoms likewise, affecting other parts of the body in a singular manner, as the mouth, tongue, throat, head, eyes, limbs, &c. will commonly carry some peculiar marks of poison, and have no relation to the disorder we are treating of.

As to venemous bites, it is chiefly those of the serpent-kind, so far as I know, which
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are said to produce such symptoms. It is generally agreed, that the bite of a viper does sometimes bring on a jaundice. This effect Dr. Mead * says is owing to spasms contracting the biliary ducts, in the same manner as colic-pains; though, perhaps, it may be doubted, whether the colic-pains ever produce a jaundice of themselves, without the assistance of stones or dregs of bile, or some other cause obstructing the biliary passages. But Dr. Simson † is of opinion from some experiments and observations, that the jaundice in this case arises from the poison acting immediately upon the blood, and producing such a change in it without causing any obstruction in the ducts, or any regurgitation of bile from the liver. Fernelius ‡ also seems to have had the same notion of it. Who, speaking of *viperæ demorsum, aut epotum venenum*, as causes which bring on a jaundice, says,

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* Treatise on Poisons.

† See his Essay on the jaundice, Medic. Essays and Observ. vol. I. edit. 4.

‡ Patholog. lib. VI. cap. 8.

Quorum vi sanguis totus pristinam amittit puritatem, et in citrinum ac biliosum humorem corrumpitur, qui omnia pervadens cutem inficit atque labefacit. Who is in the right I shall not determine, though if the jaundice usually comes on very soon, as Bianchi ‡ says he has seen it do in four hours after the bite, that should seem to be a strong argument in favour of the latter opinion. Nor, as I have never seen a case of this sort, shall I enlarge any further upon it ; only to observe, that I apprehend, a jaundice from the bite of a viper will always be known by the wound and other circumstances, and that there is no danger of confounding it with a jaundice from biliary concretions.

The other cause, that is nervous spasms, does not seem very likely to occasion all our train of symptoms, especially the jaundice with white stools ; since it is difficult to suppose the spasms durable enough, to stop the ducts so effectually
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* Hist. Hepat. tom. I. p. 186.

as to cause the bile to regurgitate and tinge the whole mass of blood; and perhaps still harder to conceive, that they should occasion a total absence of bile from the guts for so long a time as to make the stools white. And though it is true, that nervous symptoms appear in almost every part of the body, and in such different shapes as to resemble almost every disease; yet for the most part they carry with them some peculiar marks, so that, by a careful attention, they are usually to be distinguished from the like appearances arising from other causes. If we make due inquiry into the constitution of the patient, consider the well known irregularity and frequent vicissitudes of nervous complaints; and observe, as well the concurrence of some circumstances evidently of the nervous kind, as the absence of some others, which are the proper concomitants of the like disorders when they have their origin from causes of a different nature, we shall not often be in danger of confounding nervous cases with other diseases. Some
nervous

nervous symptoms indeed, in constitutions much disposed to them, will commonly attend, and mix themselves with almost every other disease, and sometimes require a regard to be had to them in the cure; while yet the true original disease is plainly to be distinguished by its proper signs. This notion of a jaundice from nervous spasms has been, perhaps, too much grounded on Sydenham's account of an hysterical or hypochondriac colic; which he describes in a manner very much resembling a fit of the stone in the biliary ducts. But as he seems to have known nothing at all of these concretions, since he never mentions them once in all his writings, it seems highly probable that he confounded the two diseases; and that, whenever he met with a patient under a fit of the stone in the biliary ducts, he imputed it merely to a nervous cause. He says, a jaundice sometimes joined itself to the other symptoms, that is, it did not always: and when he relates one particular case of a man labouring under a hypochondriac

driac colic, he does not mention the jaundice as a concomitant symptom in that instance; but on the other hand says, he determined the case to be hypochondriac by that grand criterion of nervous disorders, the large quantity of limpid colourless urine, which would hardly have happened if the blood had been loaded with bile. Indeed, he speaks too superficially of the jaundice attending the other symptoms he describes, and as a circumstance of no great importance, or rather as a good sign that the patient would soon be well; since, as he says, the jaundice would probably go off of itself, (which we know it often does when stones are dislodged and passed into the gut) or if it did not, it was to be treated with his icteric medicines. When the patient finds some relief upon the coming on of the jaundice, it seems to be owing to the bile having made its way into the blood; by which the distention is in some measure taken off from the gall-bladder, and consequently so much pain as arose merely from that distention,
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even though the stone is not yet dislodged from the duct. So that nervous spasms seem to be rather a possible than a probable cause of a jaundice; unless in those persons who have stones in the gall-bladder: for upon that supposition, the spasms may without doubt act as a remote cause, by forcing a stone out of the bladder into the duct. And perhaps it will not be very easy, to find a clear instance of it merely from a nervous cause, and free from all suspicion of some more solid and fixed obstruction, either in the gall-bladder, or duct, or in the duodenum. But when such an obstruction is once supposed, that one cause alone will account for the jaundice and all the other consequences. Therefore, where all the symptoms concur, in the manner we have described them, we shall seldom, if ever, err in our diagnostics, in ascribing them to a stoppage in the biliary passages, from concretions, or from inspissated bile; since there seems to be hardly any other cause, from which

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they can all proceed, or be well accounted for.

Having said thus much about the signs of concretions passing through the ducts, and about distinguishing them from the symptoms of other disorders, which bear some resemblance to them; let us now consider what signs there are of them while they remain in the gall-bladder itself.

And here we must observe, that the signs are not only not the same, but are also for the most part more obscure and uncertain than those of stones in the ducts; in like manner as a stone in the kidney is generally not altogether so easy to be known, as when it is got down into the ureter. It must also be owned, that the biliary stones may sometimes remain in the bladder without discovering themselves by any signs; when the number, size, shape, and the position of them in the bladder, are such as not to give the patient

patient any uneasiness, nor to interrupt the course of the bile, nor occasion any sensible disturbance to the animal functions. When there is a due quantity of bile in the bladder, and of a proper quality, and it has a free course through the duct, and there are only a few small stones, it is no wonder they should occasion no symptoms, while they continue floating in the bile, and do not come near the duct. They may also be unobserved, when, the ducts being large, and the concretions small, some of them are frequently passing off insensibly. That they may be in the bladder without any signs of them appears plainly from the ease and health, which some of these patients enjoy in the intervals of the fits; insomuch that they are often apt to flatter themselves with hope, that the cause is entirely removed, and that they shall have no return: when behold, in a short time, a stone falls again into the duct, and another fit convinces them of their mistake, and clearly proves, that there were stones in the bladder at the time

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they were so free from all complaints. The like happens in cases of the stone in the urinary passages, where there may be an absence of all symptoms for a while, though there are more stones still remaining behind, as the next succeeding fit fully demonstrates. And as we often see this in patients, whom we know from repeated fits to be troubled with stones of either kind, we cannot tell how long, or to what degree, they may remain inoffensive, and without discovering themselves by any signs, in some particular persons, who have never been subject to any fits from them. Thus both biliary and urinary stones have been unexpectedly found in bodies, which died of other diseases, that had no relation to the stones; and in which, whilst living, there had appeared no reason to suspect any such thing. Monsieur Petit * says, he has found stones in both bladders, which the persons when alive knew nothing of, because they had never occasioned any the least accident.

Baglivi

* *Memoir. de l'Acad. de Chirurg. tom. I.*

Baglivi † says the like of stones he has found in the kidneys. And to quote no more authorities on this head, Morgagni * tells us, that both he himself, and other persons of credit, have found stones in the gall-bladder, of which there had been no signs during life. Those indeed, who only dissect bodies for anatomical purposes, for the most part know nothing of the state of health of those bodies whilst living. Such subjects therefore, might have been often troubled with a jaundice, and other symptoms arising from the stones, though they were free from them at the time of their death, and died of some other diseases. But when grave and considerate physicians make such reports, upon opening the bodies of their own patients, whom they have long known, their accounts are undoubtedly to be depended upon. Though at the same time it must be owned, especially if, from the appearance of the stones, there is reason to think they have been long there, that

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† Bagliv. Oper. cap. de Calcul. & Podag.

* Adversar. III. et Epist. I.

such instances are to be looked on as rare, and out of the common course of things, since ordinarily these stones, even while they remain in the gall-bladder, if they are considerable either in size or number, do in time occasion great mischief in the body; and also afford signs by which they may be known, or with good reason suspected to be lodged there.

These signs will be different, and more or less evident, according to the size or number of the stones, as they take up more or less room in the bladder, and occasion a greater or smaller weight or uneasiness to the patient; according to their situation in the bladder, and perhaps too in some measure according to the shape of them, to the roughness or smoothness of their surface, as also their hardness, specific gravity, and other properties. If they are so large or numerous, as to distend the bladder very much beyond its natural dimensions, they may cause a tumour to be seen and felt externally on the right side, below the cartilages of the ribs, just
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in that part where the gall-bladder is situated. Bianchi * tells an extraordinary instance communicated to him by his friend Lentilius, chief physician to the duke of Wurtenburgh, of such a tumour in the right hypochondrium, or rather epigastrium, as he says. Many things had been tried to no purpose. At length a deobstruent hepatic purging infusion was given; after which three hundred concretions were voided, some as big as cardamom seeds, and some less; the tumour subsided, and the patient grew well. And Monsieur Petit§ says, the stones may sometimes be felt externally in patients that are lean, when they are either very large or numerous; and that in the latter case they are to be perceived by the fingers like a parcel of nuts in a bag. But these instances of tumours appearing outwardly happen rarely from stones only; they are more common when there is at the same time a retention of bile, to help distend the bladder, or else an abscess

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* Hist. hepat. tom. I. p. 189.

§ Memoir. de l'Acad. Royal. de Chirurg. tom. II

in those parts; of both which there are several cases told in those same memoirs. When the stones are very large, or there is a great collection of them, though not sufficient to cause a tumour to be perceived outwardly, the patient commonly feels a considerable weight and uneasiness from them. In the case before cited from Fabricius Hildanus, of those two very large stones found in the gall-bladder, he says, that the man had for many years perceived a great weight falling from one side to the other as he turned himself in his bed. They frequently occasion a dull heavy pain at times, which may be increased by any extraordinary motion, or by a distention of the stomach; for which reason such patients usually feel themselves most uneasy after eating. In some instances the pain has been very great, rarely indeed, if ever so violent as from stones passing the ducts, though more constant and durable, especially when by the largeness or situation of the stone it has pressed upon the neighbouring parts. Thus
Huldenreichius

Huldenreichius * tells of a woman enduring so much pain for thirty years, that she imagined she had a viper within her. When she was dead, upon searching for the cause of those long pains, there was found no other but a very large stone in the gall-bladder. The man, whose case, related by Hoffman, has been before referred to for a very large gall-bladder containing 3646 small calculi, had been for twenty years before his death troubled with most violent pains, a sense of great heat at the pit of the stomach, and the heart-burn. And Forestus § quotes from Langius's Epistles, the case of a patient who had suffered very violent and almost constant pain; the cause of which, upon opening the body, was found to have been, that a large stone in the gall-bladder had so compressed the colon as to wear the coats of it, while the coats of the bladder itself had no apparent marks of injury. Sometimes when the pain has been very
severe

* Ephemerid. acad. natur. curios. Dec. I. Ann. 6, 7.

§ Observat. Lib. XIX. Obser. 16.

severe, and of a hot, as it were scalding kind, attended frequently with heart-burn, nausea and vomiting, it has appeared by dissection, that, besides what the stone itself had occasioned, the bile, being obstructed in its natural course, had oozed through the coats of the bladder, and not only tinged, but even corroded the † membranes of the stomach and colon. In some patients the pain is like a fit of the colic returning at times; as was the case of that lady mentioned by Dr. Frewin, which we have before referred to upon another occasion. She had often been at Bath on that account, where she always met with some relief, though not a cure.

Besides the pain, or whether there be any pain or not, there will be for the most part, though not always, some appearance of a jaundice; more or less,
from

† Vid. Stalpert. Vander Wiel. Cent. I. Obser. 47. Hoffman Consultat. Cent. II. Cap. 49. Item Medicin. ration. systemat. Cap. de Cachex. icteric. Observ. 6. Item Cap. de dolor. & spasm. a Calcul. fell. Obs. 3.

from the lowest degree of it, when it is only to be just discerned in the whites of the eyes, to the deepest universal tincture of every part of the body, both solids and fluids. Which may either happen now and then after long intervals, and for a short continuance at a time, or may return more frequently and last longer, till at length it comes to fix and remain constantly. It is easy to conceive of all these variations, from the number, size, shape, and position of the stones, and their intercepting a larger or smaller share, or the whole of the bile. Thus a stone falling upon the neck of the gall-bladder, may stop the passage of the bile for a time, and cause a jaundice, in like manner as a stone in the urine-bladder, being lodged upon the entrance into the urethra, brings on a suppression of urine. When such a position of the stone never happens in either case, the patient having biliary stones may pass his life without a jaundice, and the other without a suppression of urine. The stone having been so lodged, and being
again

again removed from thence, the urine will pass as before in one case, and in the other, the bile returning to its natural course, the jaundice will disappear; and so by the change of situation of the stone, the jaundice comes on and goes off alternately. If the stoppage of the bile is not total, but a part of it can pass, the jaundice, as to the colour of the skin, urine and stools, will, *cæteris paribus*, be in such a degree as is proportional to the obstruction. But if the passage comes to be totally and permanently stopped, either by one large stone, or a number of small ones, taking up that part of the bladder near the neck, or by only one small stone * obstinately fixed, and quite filling up the entrance into the duct, so that no bile can ever pass, the jaundice is to be expected to continue during life.

So

* Vid. Reverhorst. Dissert. de Motu Bilis circulari, &c. Tab. II. Fig. 4. Tho. Bartholin. Hist. anat. Cent. II. Obs. 54. Scultet. Armamentar. Chirurg. Obs. 61.

So that there may be pains without a jaundice, as in that last case from Dr. Frewin, or a jaundice at times without pains, as in the case just quoted from Hildanus. But when both happen in the same patient, either together or at separate times, and there is no other apparent cause for them, we may have good reason to suppose, that there are stones in the bladder too large to enter the duct. Which we shall still the more readily conclude, if we learn that the patient has had frequent returns both of jaundice and pain, (yet not that sort of pain which happens in a fit of the stone in the duct) and that he has never voided any concretions, or any fabulous or viscid dregs of bile; especially if he also feels a constant weight just in the seat of the bladder, not in the whole region of the liver, which might depend upon other causes, and discover itself by other symptoms; if at the same time we likewise observe some appearance of a continued ill habit of body, even when the jaundice is not present;

present; and are also informed, that the appetite is diminished, and that the digestion, and other offices of the several viscera, are not regularly performed as in time of health. Thus we judge of a large stone fixed in the kidney, of a patient who has never voided any stone or gravel, by a set of symptoms, partly the same with, and partly different from, those of a stone in the ureter. And we can commonly determine the existence of such large stones; though, as I have said before, there may be some rare instances of their lying quiet there, as also in both the gall and urine-bladders, without discovering themselves by any signs.

There is yet one symptom more, which sometimes attends these stones in the gall-bladder, whether they are of the larger or smaller kind, as I just hinted among the signs of stones passing the duct; and that is a considerable pain in the right shoulder, or arm, or both. Baglivi † mentions a case of this sort in a man
who

† De Bilis natura, &c.

who was his patient, in which the pain of the right arm was very violent and almost constant for about a year before his death. *Hic per annos aliquot ante mortem facie nonnihil pallido-citrinus erat, potissimum in albo oculorum. Anno circiter ante obitum dolorem vehementissimum, ac fere continuum, nullisque cedentem remediis in brachio dextero, quod elevare, aut circumferre vix poterat, passus est.* When the body was opened, two large stones were found in the gall-bladder. A patient of mine, who had for several years been subject to violent fits of colic pains, as she called them, at the pit of the stomach, and on the right side, gave me likewise a strong description of pains in the right arm and shoulder; so that though from the rest of her narrative I presently suspected gall-stones, and though it was the right shoulder that she complained of, which I knew is sometimes affected in this, as well as in other disorders of the liver, yet I could hardly help thinking there were some rheumatic symptoms in the case; and she told me, that her disease had been,

by

by some persons to whom she applied, called a rheumatic colic. But when I saw her the second time, in one of her colic-fits, I was clear in the case, and pronounced it to be an obstruction of the ducts from biliary concretions. Accordingly, having discharged these by stool, she became free from the pain of her arm and shoulder, as well as from the colic; and never had any return of them, but enjoyed good health for several years after; when at last she died of an acute disease, which had no relation to her former case, namely the small pox.

Timæus* tells of a gentleman, who having been long and very much afflicted with arthritic pains, fell into a jaundice; and that this disease not yielding to any medicines was succeeded by a dropfy, of which he died in six months. When the body was opened, a large stone was found in the gall-bladder, which quite filled it. But as he does not describe the manner and seat of the pains, this case is not so full

* Cas. Medicinal. Lib. III. Cas. 28.

full to our purpose as that of Baglivi. Though, as we have seen before, that gouty persons are often troubled with stones both of the biliary and urinary kind, it seems probable, that there might be some connection here between the pains and this large stone, which was doubtless the cause of the jaundice and dropfy.

C H A P. IV.

Of the CONSEQUENCES OF BILIARY
CONCRETIONS.

HAVING thus given an account of the signs, by which gall-stones may be discovered, either when they are passing the ducts, or while they remain in the bladder; let us now see what are the ordinary consequences of them, if they continue long there.

The usual consequences of large or numerous biliary concretions, when they cannot be discharged, and the

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patient, escaping other fatal diseases, lives long enough for them to produce their genuine effects, are an ill habit of body, a continued jaundice, a wasting of flesh and strength, and at last an incurable dropfy.

These consequences follow by degrees, and come on sooner or later, in proportion as the bile is more or less obstructed or degenerated; and according to the strength and constitution of the patient, and other circumstances. That these are natural effects from such a cause, not only appears reasonable and evident from what has been said about the nature and use of the bile, but is also well known by experience. When this important and necessary fluid is prevented from passing into the duodenum, to be mixed with the chyle, in order to elaborate and bring it to perfection; the proper digestion of the food, and consequent nutrition of the body, must be interrupted; the several secretions and excretions are put out of order; acidities and crudities arise in the primæ viæ; the blood is impoverished; and,

and, if these continue long, a general cachexy of the whole body is brought on, which commonly ends sooner or later in a confirmed dropfy. And as the blood is impoverished by crudities, for want of the bile in its natural course; so also is it further depraved, when the bile regurgitates, and mixes immediately with it. For though a due proportion of the finer parts of the bile, when mixed with the food in the primæ viæ, along with several other of the animal fluids, and passing together with them gradually into the blood, helps to recruit it and keep it in an healthful state; yet this unnatural mixture, from the gross bile returning back immediately into the blood, and in large quantities too, tends to destroy its proper consistence and mild quality. These patients generally lose their flesh apace, and grow remarkably lean; and they also find a like decay of strength. And if such a diffusion of the bile continues long, it dissolves the red globules, renders the blood thin and acrid, and so disposes to hæmorrhages and to a dropfy. Hence the hæmorrhages we so often see in

inveterate jaundices. In which sometimes the blood is so melted down, as to have lost almost all its redness; and those cases rarely end without a dropfy in some degree, unless the patient is suddenly exhausted, and dies by the mere loss of blood. I say a dropfy in some degree; because, though that disease is commonly begun before these patients die, yet they seldom live long under it. For being much weakened both by the jaundice and by the hæmorrhages, they are not able to grapple with a new disease, and to bear up under it, till it rises to such a height, as it often does in other icteric patients, whose strength has not been impaired by bleedings.

When it happens otherwise, as now and then it does, that a man having these calculi enjoys good health for any long time, and has either no complaints, or only a small appearance of the jaundice once in a while; as was the case of the old gentleman in Fabricius Hildanus, and has been of others; it is to be supposed that the bile passes freely at all times,
except

except when a stone, falling upon the entrance of the duct, intercepts it for a while, and causes a temporary jaundice. Or if the passage by the cystic duct is in a great measure stopped, it may possibly happen that the hepatic bile is stronger than ordinary in those persons, and therefore supplies the place of the other*; or that some of the cystic bile, by passing back to the liver, finds its way by the hepatic duct; or that nature has contrived some other way to convey a part of it to the guts, as in the case related by Thomas Bartholin†; where both ducts were stopped up by calculi, and another particular duct was formed near the porus bilarius, which went from the liver to the jejunum. Perhaps also, besides the above suppositions, the constitution is by some means mended since the stones were formed, so that better bile is now secreted, and therefore they only remain as they

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were,

* That the hepatic bile may be yellow and bitter, while the cystic is pale, insipid, and inert, see chap. III. p. 158. See also p. 90 and 91.

† Histor. anatom. rarior. Cent. II. Hist. 54.



were, and do not go on to increase. Nay, and yet further, when, even after the case is come to a continued jaundice, we see patients with tolerable health in other respects, eating with an appetite, digesting their food in some good measure, and regular in their discharges by stool; though this is still more to be wondered at, yet we must here also conclude, that either some cystic bile continues to pass, or that the hepatic supplies its place. And indeed, if, as Van Swieten supposes, the vessels, by which the bile regurgitates to the vena cava in the liver, are grown so large and open by frequent fits of the jaundice, that the bile finds a ready passage through them, it is no wonder the jaundice is continued, even though the duct is not totally stopped. For if a part of the bile always goes that way, it may be enough to keep up a constant jaundice; while at the same time, the other part, still finding its way by the common course, may assist digestion in some measure, and both colour the stools and promote their discharge. And as the
other

other chylopoietic viscera have been deprived of the usual assistance of the liver by degrees, they still continue to perform their office in a tolerable manner with a smaller quantity of bile. Thus we see in other instances, that the body is brought gradually to new habits, and ways of acting; and patients hold out long beyond expectation, after some one, or perhaps several important viscera are greatly decayed; nay even when they are become so unfit to perform their proper office, that it seems wonderful, how life can subsist, and the several motions of so complicated a machine be at any rate carried on, when so many springs are out of order. Any one, who is not fully aware of this from observations in practice, and experience in opening morbid bodies, may, by looking into Bonetus's *Sepulchretum Anatomicum*, find innumerable examples to this purpose. And the more any man knows of the human body, and of the various disorders of its several inward parts, the less will he be disposed to wonder at the failure of all remedies

in a multitude of cases which occur to him in practice ; because he is the more sensible of the incurableness of some, and of the small probability of a cure in others. A wise physician will much oftener be surprized at the recovery, or at the long continuance of some of his patients, than at the death of others in seemingly like circumstances.

Other consequences also are ascribed to these concretions by some authors, particularly by Bianchi, and among the rest sudden death : *Vel tandem post diuturnas stationes in subitaneas neces * præcipitent.* This professor is free enough in his assertions on this head, as indeed he is in many other instances, but very deficient in his proof. He quotes only three cases in support of this doctrine, and all of them very little, if any thing, to his purpose. A man may die suddenly having stones in the gall-bladder, without their contributing at all to his death. And it will be no proof of their being any ways the occasion

* Histor. Hepat. tom. I. p. 482. vid. etiam, p. 188.

sion of it, that upon opening the body there were no other morbid appearances, as was the case in one of the persons Bianchi mentions; since there are several causes of sudden death, which leave no visible marks behind them, nor any traces discoverable by dissection. Nor indeed is it easy to conceive how these stones can be properly and directly the cause of sudden death, without bringing on some other disease previous to it; unless perhaps a stone should suddenly stop the duct, and the bile being hastily collected, and not finding a passage to regurgitate into the blood, should distend the bladder till it bursts. Which, as it has been known to happen from other * causes totally obstructing the course of the bile, may possibly happen from a like stoppage by a stone. For if the stones should occasion any other disease that quickly proves fatal, as an inflammation ending in a mortification, which is one of the most acute cases we can well

* Vid. Job. a Meckren. Observat. Medic. Chirurg. cap. 46.

well suppose ; such a patient could hardly be said to die of a sudden death, any more than a man dying of an iliac passion or a pleurisy ; both which may, and commonly do when they prove quickly fatal, end in a mortification. And much less can we call it sudden death, when a lingering chronic disease has intervened as the effect of these stones ; though, perhaps, the patient may at last go off suddenly ; that is, when he had in appearance been as well but just before, as he had been for a great while past. Thus the two patients mentioned by Vesalius *, in whose gall-bladders he found stones, went off on a sudden, and yet could not with propriety be said to die of sudden deaths ; as both had been ailing for several years, one with a general ill habit of body, the other with a jaundice. In like manner we see in other chronic diseases, in a consumption, for example, or a dropsy, &c. as some patients linger out far beyond all expectation,

* Epist. de Rad. Chyn.

tion, so others drop off at once, when there was reason to expect they might have held out longer. But can these be said to die of sudden death, because they escape the usual concluding scene; when their distemper was before so far confirmed, that they were beyond all hope of recovery? What we properly mean by sudden death is, when a person dies suddenly, who was to all appearance in good health before; or at least, when that which was the cause of his death had not discovered itself by any previous symptoms. Of this sort of causes of sudden death are extravasations of fluids in the cavities of the body, from the bursting of the vessels, or of some of the viscera themselves; the breaking of a latent unsuspected abscess; any thing that stops the vital motions, either the action of the heart, or of the organs of respiration, or of the nerves belonging to them; violent passions of the mind, as outrageous anger, excessive joy, an immoderate fright, &c. There is an instance in Baglivi*, much more

* De Bilis Natura.

more to the purpose than any of Bianchi's cases, of a patient long troubled with these biliary stones dying suddenly apoplectic; where, upon opening the head, the vessels were found ruptured, and a large quantity of black thick blood extravasated in the ventricles of the brain. But what relation have gall-stones to such an effect, unless the blood, by being for a long time loaded with bile, is become so acrid as to corrode the vessels and cause an hæmorrhage; which we so often see happen from the nose, gums, and other parts, in long jaundices, even to such a degree as to threaten immediate death, or at least to be the forerunner of it at no very great distance? Now, if an hæmorrhage happens in like manner from the internal vessels of the head, as it does so frequently from the external, it may well occasion an apoplexy to close the scene. But then, though the catastrophe is sudden, that state of blood, which occasions it at last, is brought on by degrees. So that a sudden death seems to have no proper connection with biliary concretions
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without the intervention of some other disease. And that it was so in this case of Baglivi's is evident, since the patient had been in an ill state of health for some years before his death. It is also probable, that the blood was grown acrid, as it had been so long tinged with bile, and as the bile that was found in the gall-bladder was black like pitch. There is, indeed, another way, in which these stones may, as a remote cause, dispose to apoplexies, and other diseases of the head, besides this of a continued regurgitation of the bile, by which the blood is made acrid; and that is by making it poor and phlegmatic, from the want of a due quantity of bile in the digesting organs, as has been before said. For this state of blood may bring on an apoplexy of the cold pituitous kind. But as this effect will be gradual, and there will commonly be several preceding cachectic symptoms, neither can this case be properly called sudden death. Thus that lady, in whose gall-bladder 300 calculi were found, as mentioned p. 115. from
Platerus,

Platerus, died lethargic; but then her legs had swelled for some time before. But in many cases, where biliary stones are unexpectedly found in bodies that died apoplectic, it may well be supposed, that the apoplexy proceeded from some of its usual and proper causes, without any assistance from the stones; and that those persons would have died in the same way, if there had been no stones in the gall-bladder. For persons having these stones are nevertheless liable to all other diseases, and may die of any one, whether it be an apoplexy, or the small pox, or any other distemper the most remote from any relation to the stones. And accordingly they are found in bodies dying of almost all kinds of diseases, many of which can under no pretence be imputed to them as the cause; as they are likewise in bodies of persons cut off by a sudden or a violent death, who were to all appearance in perfect health, the stones either not having yet produced any sensible effects, or none being present at the time of their death. Whosoever, there-

fore, will imagine these stones to be the cause of all the morbid appearances, with which upon opening bodies they are sometimes found, may at one time or another reckon almost all diseases to be the consequences of them: whereas in some cases it might as well be supposed, that the stones are occasioned by the other disorders. But indeed, in many complicated cases, it is difficult to determine the connection between the several morbid appearances, and to say which of them was the cause of the other; or, sometimes, whether they had any dependance at all upon one another. And on this account we often find the practical anatomist, in his histories of morbid dissections, not a little confused in assigning the proper causes of death; and sometimes ascribing it to wrong causes in other instances besides these biliary stones. Thus we may observe in Bonetus's *Sepulchretum Anatomicum*, that he very often brings in the history of the same case under different articles of his collection, where he is treating of very different diseases.

Morton

Morton also, when he would deduce a phthisis pulmonalis from a jaundice, whether that jaundice proceeds from calculi, or from other causes, seems to multiply the kinds of pthisis too much, as indeed he does in other instances. For when a jaundice and a phthisis pulmonalis happen together, it may be looked upon rather as an accidental complication, than that the diseases have any necessary connection with each other. It is true, a cough often attends disorders of the liver; which deceives many, and makes them suppose the patient either asthmatic or consumptive, and that the case is to be treated with balsamics and pectorals, &c. as if it depended on a bad state of the lungs. Whereas the lungs may be quite sound, and the cough owing solely to obstructions in the liver, and only to be cured by such means as can remove those obstructions. Nor is such a cough, even when attended with a jaundice, very likely to bring on a consumption of the lungs, unless it continues very long, or happens in patients particularly disposed to

to that disease ; but will much more commonly be succeeded by a dropfy ; which is the genuine consequence of incurable obstructions of the liver, and, as Morton indeed owns, almost always attended towards the end of his phthisis icteritia.

Some writers seem to ascribe too much to these calculi, and others to be too little sensible of their effects. Thus Scultetus, in his *Armamentarium Chirurgicum* *, imputes a cancer in the uterus in one instance, and a cancer in the colon in another, to a stone found in the gall-bladder in each of those bodies ; and he imagines this to be the reason of it, that as no bile passed in its natural course, nor was repelled to the skin, (neither of the patients having the jaundice at the time of their death) therefore it was transmitted to the uterus and colon. Bonetus thinks this reasoning so good, that, when he recites these cases from Scultetus, he applies it to the history he himself relates of a wo-

* Observat. 61.

man that died of a peripneumony, in whose gall-bladder many stones were found ; the bile, as he says, not being translated to the habit of body but to the lungs. And Spigelius is so much convinced, that the stones were the cause of the cancers ; that he says, if those patients had had a cancer in an external part, which could have been quite extirpated, and the wound completely healed ; yet, as the cause remained, the obstruction in the gall-bladder being incurable, there would have been still the disposition in the blood, and a new and fatal cancer would have seized some principal part within three or four years. Bianchi also is so well pleased with this reasoning, that he refers to the passage in Bonetus, and from thence takes occasion to make an exception to his own doctrine, which he had before insisted upon as universally true ; namely, that all people whatsoever, who have gall-stones, must have more or less of a jaundice, and that every one must have been mistaken, who had told an instance of any such persons dying without having
ever

ever had a jaundice. He now says,
 “ Those only have no jaundice, in whom
 “ the bile, being stopped in its natural
 “ course, falls upon some particular vis-
 “ cus, and there produces some violent
 “ and generally fatal disease.” But what
 did these authors mean by a translation
 of the bile? What reason had they to
 imagine any such thing? Who knows
 any connection between a stoppage of the
 bile in its ordinary course and a cancer?
 Are persons that have gall-stones at all
 more subject to cancers than others?
 Do we in fact often meet with these two
 cases in the same patient? Might not
 every one of those patients have had the
 jaundice often, though there was no ap-
 pearance of it at the time of their death?
 Might not these authors as well have sup-
 posed any other morbid state of the ute-
 rus or colon, or of any other of the vis-
 cera to proceed from gall-stones as a can-
 cer, or any other acute disease as a pe-
 ripneumony? And might they not with
 as much reason, so far as appears, have
 imagined that the stones took their rise
 from the cancers?

On the other hand, some anatomists are apt to think too little of the effects of biliary calculi. They find them in bodies of whose history during life they know nothing ; and if there is in the bodies no evident mark of mischief from the stones, they are apt to suppose there has been none. What pain a patient may have felt from them cannot ordinarily be guessed at from viewing the body. If no jaundice appears upon it, they conclude the patient never had a jaundice ; whereas he may have had it many times. A jaundice is not to be expected in a body having gall-stones, unless the patient died in a fit of the stone while the jaundice was upon him, or was come to that state to have it fixed permanently. For a man that has gall-stones may be and often is, when free from a fit, as clear of the jaundice as another man, though he is always liable to a sudden return of it. A mere anatomist therefore knows but little of the effects of gall-stones. He is not a competent judge how often they occasion a jaundice. It is possible he may have dissected

dissected twenty bodies, or many more, having stones, and found no jaundice in any one of them; and yet every one of them may have had it twenty times, or more. If the woman mentioned by Bianchi, who had the jaundice once in a month for twelve or fifteen days at a time, and at last voided that large stone bigger than a walnut, had died of some other disease in an interval of the fits, and her body had been opened by an anatomist who knew nothing of her history, the stone would have been found, but he had known nothing of the jaundice; and possibly he might have related the case as one of those where a large stone was found which had not occasioned the jaundice. It seems, however, very strange, that Morgagni, among the great number of bodies in which he found gall-stones, should never happen to dissect one that died with the jaundice upon it. Perhaps no other anatomist could say the like of a quarter of that number. He owns indeed, that a jaundice sometimes attends these stones, though he never met with an instance of

it. But this does not alter the case, any more than if another particular man had happened to open many icteric bodies, and had never found any gall-stones; the jaundice having in all those instances proceeded from other causes; or else the stones having all passed away before the death of the patients, as they are sometimes known to do. For though stones are found in dead bodies without a jaundice, and a jaundice without stones, yet it remains undoubted, that there is a connection between them, and that the jaundice is often occasioned by stones. This is abundantly evident to every practitioner, who has made proper observations on patients voiding these calculi. Nevertheless, it may be very difficult to say precisely, in what state of the bile, in what condition of the gall bladder, of the ducts, and of the stones themselves, they must necessarily produce a jaundice; and in what different state of things a person having gall-stones may happen to pass his life without it. Must it not also be difficult in some circumstances, particularly when
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the cystic bile is whitish, to tell in what manner the stones do occasion a jaundice, unless it be by compressing the hepatic, or obstructing the common duct? And yet we find a jaundice with bile of all colours in the gall-bladder along with stones, and also, when there is little or no bile there. But further observations and dissections may in time explain and remove many difficulties of this sort. And must we not in the mean time suppose, that when a white fluid is found in the gall-bladder in icteric bodies, there must have been yellow bile in the hepatic duct, as in the instance mentioned pag. 158, and some degree of regurgitation from thence, even though that duct might not be altogether stopped? Professor Haller says, that the gall-stones are sometimes attended with the jaundice, but are for the most part found without it, according to his experience. In this instance he speaks only as an anatomist, not as a practitioner. Among his thirteen dissections there is an account of the jaundice only in two. But then most of his subjects were

bodies brought to the anatomical theatre, of which he knew nothing during life. One of the two icteric bodies was of that sort. The other was the body of a gentleman whose case the professor knew, and has given us some account of. Had he known the histories of the rest, it is very probable he would have found, that most of them had some time or other been troubled with the jaundice, though they had it not at the same time of their death. But it is not to be expected, that the anatomist should know what have been the lives of the bodies he dissects, or even the manner of their death, unless it was violent, or indubitable marks of the particular fatal disease appear in the bodies themselves. It is not therefore from anatomy alone, that the signs and consequences of these stones are to be fully known. Neither could the practical physician have been sufficiently acquainted with them without the assistance of anatomy. If none had ever been found by dissection, he would have been at a loss about those which he sees come away
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by stool. For though from their evident composition, he might conclude them to be formed of bile, yet he could not have judged well, either of the seat of them, or of the manner of their formation; and would have been quite unacquainted with those that are too large to pass. But when he comes to apply the discoveries made by anatomy, and his knowledge of the animal œconomy, to what he meets with in practice, and reasons justly from them; then is he able to form a proper judgment of these cases, and to distinguish them from others which they may somewhat resemble. When he attends upon patients of this sort, he observes the seat and manner of the complaints, with all the symptoms of the case, and finds them to correspond with his idea of an obstructed gall-bladder. In some he sees, that upon the going off of the complaints stones are found in the stools, soon after which the jaundice and all the other symptoms disappear, and the patient is well for the present at least. This confirms his judgment, that the stones were
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the true cause of all those appearances. After a while, though at very uncertain intervals, the same scene returns and goes off in like manner. Till at length, after several fits, the stones being all discharged, the patient recovers a confirmed state of health. But in other patients he observes a quite different state of things. He finds that the paroxysms are not so uniform, nor go so clearly off, that no stones are discharged, that the patient is hardly ever free from complaint, that no medicines have any effect, unless it be only to palliate some symptoms; and that, instead of recovering health, the patient gradually declines, till he falls into a confirmed ill habit of body, or a continued jaundice; either of which generally ends in an incurable dropfy. And if, upon opening the body, the gall-bladder is found obstructed by large or numerous stones, the physician thinks, that upon fair reasoning justly deduced from the laws of the animal œconomy, the preceding train of symptoms may be accounted genuine consequences of gall-stones too large to pass. At the
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same time, if any other morbid appearances are also found, which are not fairly deducible from obstructions of the bile, he will not impute them to the stones, but reckon them the effects of other causes accidentally occurring along with the stones in the gall-bladder.

I have said in the preceding chapter, that these stones are found joined with a fever, or an inflammation, and granted that possibly they may sometimes be the occasion of them. And when an inflammation of the liver happens, it may come to an abscess; which may either destroy the patient in a little time, or bring on a slow hectic, and end in a tabes hepatica, as other internal abscesses and ulcers produce consumptions of different kinds. But as these cases are only accidental, not the ordinary effects, and often happen from other causes, and to patients not troubled with these calculi, I shall not enlarge upon such circumstances here, when I am speaking of the usual consequences of them. And such
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accidental instances are no more to be objected against my general doctrine of the ordinary consequences, than that these stones sometimes occasion no apparent symptoms at all; either from the make and constitution of some particular patients, or because they are cut off by some other disease before the stones have been long formed, or are come to such a state as to produce their natural and usual consequences.

It may indeed be observed, that when these patients die dropfical, it is commonly found upon opening the bodies, that there is some other mischief besides stones in the gall-bladder. The liver itself is usually found in a bad state, and not rarely both that and some of the other viscera likewise. Very often, nay perhaps for the most part, the liver is overgrown; and on the other hand, sometimes it may be contracted below its natural size, and appear almost as if it was boiled; it is frequently scirrhus, either the whole of it, or in parts; sometimes
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there are tubercles in it, sometimes hydatides, impostumations, or various other morbid appearances; but seldom, if ever, is it quite sound. Nor is this to be wondered at, when the course of the bile has been so long interrupted, or turned retrograde. It appears therefore, that as these calculi do not occasion sudden death, as was before said, without the intervention of some other acute disease; so neither do they ordinarily bring on a lingering death without the assistance of some other chronic disease; though in either case the other disease may arise from them: nor do they produce a dropsey in particular, till some great mischief is first formed in the liver itself, or in some other of the inward parts. I say ordinarily, because perhaps it is possible, that, in some very few instances, they may occasion such continued violent pain, as may wear out the patient before there is any formed decay in any particular part. Thus the stone in the urinary passages does not quickly prove fatal, unless it causes a suppression of urine, or a violent hæmorrhage,
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or a high fever, with inflammation, mortification, &c. And when it occasions a lingering death, it is commonly either by bringing on ulcers, dropfy, hectic, &c. or by wearing out the patient with great and tedious pain.

I may also further observe, that gallstones may occasion all these consequences, a decayed liver, a dropfy, and death, and yet there may be no stones found on opening the body. They may have remained long enough to produce all this mischief, but may have passed off before the death of the patient. In the body of one woman, which I saw opened to search for stones, there were none found; although I had been long persuaded from frequent fits of pain, jaundice, &c. that she had been troubled with them for several years. For the last year of her life, or perhaps more, the jaundice had been constant, but she had not the pains as before. The whole liver was unsound, and there was a beginning ascites; which she would doubtless have survived, till it had advanced
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to a much higher degree, if her strength had not been greatly and suddenly impaired by a large hæmorrhage at the nose, which lasted for several days, some little time before her death. She was too irregular a patient, to have her stools searched for stones upon the going off of the fits of pain and jaundice; otherwise, it is highly probable, they would have been perceived to come away: and she was too unruly and obstinate, to submit to any course of medicines, (except so far as to relieve violent pains) while there was room to hope for a cure; although, as she was poor, both advice and medicines were freely offered her out of charity.

When the case is so far advanced, as to come to a confirmed dropfy, there is no hope of a cure, even though the stones should then be discharged, either spontaneously, or by the force of medicines, or though the bladder had been clear of them long before. There can be no cure in such a state of things, unless the de-
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cayed liver, or other viscera, could be made sound again, which is not to be supposed. We read of a case in Hoffman†, where the stones were expelled by the help of medicines, but the dropfy remained, increased, and proved fatal. But there is no need of examples; the thing is self-evident without them. There is no more good to be expected from voiding these stones at such a time, when they have brought on all this incurable mischief; than from a flow of urine after it has been too long suppress'd, even if the calculus, which occasioned the suppression, should then be expelled along with the urine; or from a plentiful discharge of fæces by stool, at the end of an obstinate, incurable colic; when the parts, in either case, are relaxed by a mortification, and the patient is just ready to expire.

C H A P.

† *Medicin. Rational. systemat. Cap. de dolor. & spasm. acalcul. fell. Observ. 2.*

C H A P. V.

Of the CURE of BILIARY CONCRETIONS.

IT seems strange, that so many grave authors have pronounced this case incurable ; when they knew from Fernelius, if they had never observed it themselves, that these calculi are often discharged by the spontaneous efforts of nature. Now, if they often come away without any help, why should any one doubt of its being within the power of art to assist nature in the discharge of these, as well as of the urinary calculi ? Are not stones in the gall-bladder, and ducts, full as much within the reach of medicines as those in the kidneys or ureters ? Are not stimulating medicines, suppose vomits, strong purges, &c. yet more likely to remove the biliary obstructions, than those of the urinary passages ; as they act more directly upon the parts, which have an immediate connection with the seat of the obstructions ? Will not the former case

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better bear the shock of powerful active medicines than the latter? Or, is there not less danger of bad consequences, such as hæmorrhages, inflammations, &c. from stimulating medicines, in biliary obstructions, than when stones are lodged in the kidneys; both from the different structure of the parts, and, ordinarily, from the difference of the calculi themselves; as those of the biliary kind are for the most part less hard and rough, and less disposed to a longish shape, and therefore not so liable to fall across the duct, and fix there, even when from their size they might come away if their position was right? And when the stones have once got through the biliary ducts, is there not a much more patent and easy passage for them out of the body, than for those which have made their way from the kidneys, through the ureters, to the bladder? So that when biliary stones are got into the duodenum, there is commonly an end of trouble to the patient from them. For it is but rarely that they are perceived in the guts, unless they are very large,

large, or, by their long stay there, they have become the nuclei of intestinal concretions; when indeed, as has been before observed, they may sometimes stop by the way, and cause pain as they pass, in any part of the intestinal tube, and especially at their exclusion through the sphincter ani. Whereas, when the urinary calculi have passed from the kidneys to the bladder, they are for the most part the occasion of some further trouble there, and too often even of greater than before. But here we may observe by the way, that strong forcing medicines are not proper in either case, when there is reason to suppose the stones are too large to be capable of passing; lest by the irritation, the patients should suffer more from the remedy, than from the disease. Nevertheless, for want of being as well acquainted with the biliary calculi, as with those of the urinary kind, Sennertus, Riverius, Etmullerus, Baglivi, and other physicians of great note, have pronounced in general, that a jaundice proceeding from calculi is incurable. Sylvius de le Boe indeed, though he says

very little about these calculi, just mentions the cure of them, but as a thing almost unheard of. *Cum difficile sit calculos ex bile ortos dignoscere, non mirum si eorundem curatio res inaudita videatur multis medicis* *. But what he says about it seems to be from theory and tradition rather than from experience. He proposes *grafs* as one of his dissolvents, which he takes from the case of the horned cattle, and *spiritus nitri dulcis* as the other; and *volatile salts* to prevent any new concretions. Now, though it may be true of some particular jaundices, depending upon calculi too large to be brought away, and of too solid a consistence to be dissolvable by any means, that they are incurable, yet we know this is very far from being universally true, as we see that the smaller ones are often expelled, and sometimes too those of very considerable sizes, either by nature alone, or with the assistance of medicines; and that the jaundice, which was occasioned by them, goes off upon their expulsion. Nay it seems probable, that most of the jaundices which
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* Prax. Medic. lib. I. cap. 45.

are cured (I mean such as do not proceed from some particular cause, such as fever and inflammation, or the temporary pressure of a distended uterus, or colon, &c.) take their rise either from calculi, or dregs of bile in the bladder or ducts, or else from a load of viscidities, or some other disorder in the duodenum. Therefore it is as absurd to pronounce every jaundice arising from calculi incurable, as it would be to say, that no case of stones in the kidneys can be cured, because too many prove incurable. And what disease is there, in which there are not some cases that do not admit of a cure?

But though these learned men made this mistaken prognostic, reckoning, that because these stones could not be dissolved, therefore the jaundice depending upon them could not be cured; yet, doubtless they frequently cured such jaundices, contrary to their own theory, by their deobstruent and evacuating medicines, while at the same time they were ignorant of the manner in which the patients were

cured, for want of having the discharges by stool properly examined. For as these calculi are often spontaneously discharged, and as the jaundice usually disappears in a short time after they are dislodged from the ducts, even sometimes before they have passed quite through the guts, when the body is costive; such medicines as operate upon the bile and its ducts, or upon the guts, may help to dislodge and bring away the calculi, and in consequence of that to cure the jaundice. So likewise other medicines, that have no such efficacy, when given at a lucky time, just as nature was about to remove, or perhaps had removed the obstruction, may seem to cure the jaundice, and acquire the reputation of virtues that do not belong to them. On account of some of these seeming cures, and because it is a visible disease, the jaundice is so often undertaken by the vulgar; who pretend to great skill in this, and some other distempers, which are in any respect the objects of their eye-sight. They have their remedies for this disease, which they

reckon infallible, at least in all curable cases; and which they apply boldly in every jaundice, without any distinction, or conception, of the different causes it may proceed from, or knowing, that a jaundice from some causes is easily cured, or may go off without the help of art, and that when it proceeds from some other causes it is not to be cured at all. And if their remedies, as they call them, of how little efficacy soever they may be, happen to be applied when the obstructing bodies are making their way through the passages, and the bile is just returning to its natural course, they get the credit of curing the jaundice. Upon which the prescribers of them grow confident of their experience, and reckon they know at least as much of this disease as any of the learned faculty, and are even for claiming the care of it as an exclusive province to themselves, as many nurses do of the small pox. By which bold pretensions ignorant patients are often deluded to their hurt, till they have lost the opportunity of relief, which their cases

might have admitted of at first, and time and disappointment have convinced them of their error. For what is experience without judgment? Of what use are the histories of a thousand patients, who are said to have recovered from this or that disease, when they are told by such persons as know not how to make proper observations, being altogether ignorant of the structure of the human body, of the nature and causes of diseases, of the virtues of medicines, and the manner in which they ought to operate, in order to produce a good effect? If experience was no more than barely seeing the cases, and the event of them, the skill of an old nurse might sometimes be equal to that of a wise physician. But there is a very extensive preliminary knowledge necessary, and a constant and careful application of it, in order to make observations in such a manner, as that they can be the ground of useful experience, and of true judgment built upon it. And numberless other circumstances are to be well weighed and considered, in order to
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form a right judgment, even of some diseases that are to be seen in the skin, besides what appears outwardly to the eye. Nay, I may venture to affirm, that some diseases which are visible, but have their origin and connection within, are not the most intelligible, or the most easy to cure. Yet the vulgar, guided only by their senses, think themselves, in some diseases, competent judges merely from what they can see outwardly. And, being no wiser about remedies than about diseases, are fond of any thing they hear of as a medicine, though ever so insignificant; especially if they have known any one recover that has taken it. Thus many trifles have obtained the name of famous remedies in the jaundice, because they have been used by patients who recovered; though those patients would undoubtedly have recovered as well without them. And I wish I could confine this to the vulgar only. I wish there was no false imaginary experience among other practitioners; no conclusions too hastily drawn from inaccurate observations, and from
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too few, or perhaps even from a single example; that there were no trifles used, and depended upon by them, in this as well as many other diseases; things that are either trifles in themselves with regard to their virtues, or real and efficacious medicines made trifles by being prescribed in idle insignificant doses. But of this I may, perhaps, have occasion to take further notice afterwards.

These things being premised, I proceed to what I have to say about the cure. But here I desire it may be observed, that when I speak of the cure of these calculi, I suppose the case to be simple. For when it is complicated with some other disease, whether acute or chronical, it may be necessary, either to postpone the cure of the calculi, or to treat them only in such manner as may be consistent with a due attention to that other disease. Thus if a calculous patient is seized with a fever, or any other violent disease, there can be no doubt, but that (as in all other complicated cases) the first and principal regard

gard is to be had to that disease, and to those symptoms, from which there is the most apparent or immediate danger. Or if a patient, having biliary calculi, is also troubled with the stone in the urinary passages, or with the gout, (and that all the three diseases have some connection; and may happen in the same person, appears from what has been said in the second chapter) or with any other chronic disease, the cure must be directed, as far as possible, with a proper regard to each disease. Nay, even when these calculi happen to a woman with child, as is not uncommon both in the beginning and in the advanced state of pregnancy, although her being with child is not properly a disease, yet it makes a sort of complication in the case; and she cannot always be treated like another patient, but a particular care and attention ought to be had to her condition as a woman with child.

The indications of cure are, to dislodge and expel the calculi, when it can be

be done ; to relieve the symptoms in the mean while ; to alter and amend the habit of body, so as to remove the disposition to breed more ; and, when they cannot be expelled, to palliate the case, and prevent the consequences as much as may be.

These indications are to be pursued by different methods, according to the constitution of the patient and the circumstances of the case. For neither in this, nor in any other disease, will one and the same method be suitable to all patients. It is altogether absurd to imagine, that there can be any one universal medicine ; or that any prescription, or any certain set of prescriptions, to be used one after another in a determinate regular course, can be proper for all people. If this could be ; if there was such a stated regularity in diseases and constitutions, that the same remedies were always proper, and would have the same effect ; then in all well-known evident disorders, every one, that is acquainted
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with such a set of remedies, might apply them as well as a physician of ever so great judgment and long experience. But as the same disease differs so much from itself, according to the several causes it proceeds from, to the time and stages of it, to the various constitutions of different patients, and many other circumstances, nay and even in the same patient at different times; it is very evident, that the same remedies cannot always answer alike, and that what is very beneficial and successful in one case, and at one time, may fail, or even prove detrimental and pernicious in another. So that the skill in prescribing lies not so much in knowing what remedies are good in this or that distemper, as in distinguishing rightly, after a full examination, and a careful attention to all the particulars of a case, and being from thence able to determine, which of them are most proper, and when and how they are to be administered; because a medicine may be good for this or that disease, which is not good for this or that patient.

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Therefore when we enumerate the several remedies, that may be useful in any disease, we suppose some judgment in the reader how to apply them; both as to the choice of medicines, the variation of doses, the times of using them, and other circumstances; and whether some of them should be used at all, or not, in particular cases; as it is impossible for any writer to specify, or even to suppose, all the variations that will be sometimes necessary to be made, in order to adapt them to every individual case or patient. And without such judgment, the possession of a multiplicity of prescriptions is not merely useless, but likely to be of dangerous consequence. If a man had a whole dispensatory by heart, which contained the most excellent prescriptions for all diseases; but had not understanding sufficient to discern the particulars of cases, and the difference of constitutions, and to vary his method accordingly; he would still be as unfit to practise physic, as a man, who had learned the terms of art, and the common rules of navigation,

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tion, but had never been at sea, would be to direct the management of a ship in a storm, or among rocks, or upon dangerous coasts. Nor could any better success be expected to attend his practice, than might be hoped for in agriculture, or gardening, from following the same rules indiscriminately in all soils, and without any regard to the difference of climates, or situations, or to the variations of the weather in different seasons. Thus bleeding is a remedy of the greatest importance, in some fevers, and in many other diseases, under proper regulations. But if any man should use it with the same freedom, in every kind, or in every stage, of fevers; or in other diseases, without any distinction of the different and even opposite causes from which they may proceed; as in apoplexies for example, or palsies, whether from a cold phlegmatic cause, or from a hot sanguine one, and without a due regard to the strength and constitution of his patients; he would certainly be a most dangerous practitioner, and likely to do harm much oftener than good.

good. I wish many people could be convinced of the truth of this, who, either from a fond conceit of skill which they have no title to, or from an officious mistaken humanity, are too forward in prescribing to their friends and neighbours. Which they do the more boldly, when they imagine the case to be the same with what they themselves, or some of their friends, have laboured under and recovered from, and they happen to know the remedies that were applied: They then advise with confidence of success, reckoning themselves supported by experience; though very often the cases are so widely different, that the methods which were proper and successful in the cases they refer to, may be very wrong and pernicious in those to which they apply them. This notion of the sameness of cases, in the minds of incompetent judges, who are thus forward to assume an office they are by no means qualified for, has destroyed, and daily does destroy, a multitude of lives; more perhaps than any one disease to which mankind is

is subject. We meet with frequent instances of it in practice. But it is often too late to remedy them. The wrong step is taken, and cannot be reversed: the mischief is done, and very often is too great to be repaired. And so great is this mistake about the sameness of cases, which often arises only from a faint resemblance in one or a few particulars, that the judicious practitioner does but rarely meet with two cases so much the same, as to prescribe exactly alike, by the same unvaried forms throughout the whole of his attendance. He knows indeed how to distinguish appearances, and how to vary his prescription as the difference of circumstances requires: whereas, the pretender to practice is easily deceived by a false likeness, and also must keep to the letter of the prescriptions he has learned, whatever occasion there may be for alterations. Thus are the lives of men exposed to great danger, or even destroyed, by the rashness and mistaken kindness of wellmeaning people; who, though they are so ready at advising where life is

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at stake, would at no rate presume to dictate in a case of law, where only a small matter of property was concerned ; but would refer their friend for advice to those, whose proper business it is to direct him. So free do these people make with a man's life, who are so discretely and scrupulously tender of his property.

But leaving these general things, I come more directly to my subject.

In a fit of the stone in the biliary ducts bleeding is sometimes very proper, but far from being always so. If a high fever, with great inflammation, attends the case, bleeding is evidently necessary, without much regard to the particular cause of that fever ; and the sooner it is done the better, as in all inflammatory diseases the beginning is the time for this evacuation. Nor will it be disputed, but that in strong sanguine constitutions, it may sometimes be prudent to bleed, in order to prevent inflammation and fever, from the violence of the pain and great irritation.

Besides that, in such constitutions, emptying the vessels will help to relax the fibres, and by that means promote the dilatation of the ducts for the expulsion of the calculi, and, moreover, render the use of other medicines both more safe, and more effectual. For these reasons we order bleeding in a fit of the stone in the urinary passages; as also sometimes for women in labour, or just before it is expected. In other circumstances of our disorder bleeding is not necessary. And if, as I have before observed, we oftener find a patient with a quiet pulse, and free from fever, in this case, than in the fit of a stone passing the ureter, we shall so much the seldomer have occasion to think of bleeding. In short, the same judgment, and rules of prudence, will direct us in bleeding, or omitting it, here, as in other diseases. And when the symptoms do not call for it, we shall rather avoid weakening our patients unnecessarily; as bleeding does not contribute to the cure, unless by removing some impediments to it, or for such reasons as those

abovementioned. We may here also take occasion to observe the wrong practice of those who make it a stated rule to begin the cure of a jaundice with bleeding, whatever the cause be from which it proceeds ; since it cannot be doubted, that though bleeding may be very beneficial in some jaundices, it may also be very detrimental in others.

A vomit is the next remedy I shall mention ; which, when rightly directed, seems to be a very important one, and capable of contributing, at least as much as any, towards dislodging the calculi from the gall-bladder and ducts. The primary operation of a vomit is upon the stomach ; but, by the convulsive motion it occasions there, it affects all the parts which are contiguous to the stomach, and also gives such a shock to the whole body, as increases the velocity of the blood and other fluids moving through their several vessels. It is therefore a remedy not to be used without caution ; and is by no means proper in all cases and constitutions,

tions, even where upon a slight superficial view it may seem to be indicated ; for as in some cases a vomit is capable of doing the greatest good, so in others it may be productive of the greatest mischief. In such obstructions as require shaking, when at the same time the patient is able to bear it, without danger of straining the solids too much, or of accelerating the motion of the fluids, so as to burst the vessels, or make too great a distention in them, vomits are of singular use. But where either from the general habit of body, or from the weakness or disorder of some particular part, there is reason to suspect bad consequences from such shaking as a vomit must occasion, it ought either to be wholly omitted, or postponed till the reason against it is ceased ; or at least, if it be used at all, it should be with the utmost care and circumspection. Thus in plethoric patients, a vomit can hardly be safe till the plethora is removed by bleeding, whatever the indications for vomiting might appear to be. In a high fever, attended with inflammation of any

of the inward parts, the danger of a vomit is very evident. So likewise in a sanguine apoplexy, or palsy, proceeding either from a rupture or distention of the blood-vessels of the brain, the operation of a vomit, which affects the circulation in the head as much perhaps as in any part of the body, must be expected to aggravate the case, and to destroy the patient the more certainly; by increasing the hæmorrhage, if it is begun, or by causing a rupture of the vessels, if they were only distended before. Whereas in these very diseases, when they arise from a cold sluggish cause, a vomit may be one of the best means to stimulate the relaxed fibres, and to propel the inactive fluids, in order to remove the obstruction. And in these phlegmatic cases bleeding may sometimes be as improper as vomits in the sanguine. So necessary it is to make distinctions about diseases, according to the different causes from which they may proceed, in order to know how to treat them properly. In like manner, those who have weak lungs, or whose vessels are

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are tender, and at the same time have a thin sharp blood, should be extremely cautious of vomits, for fear of an hæmoptoe, or some other hæmorrhage either internal or external. As also should those be, who have been long in an ill habit of body from unsound viscera, especially, if there be reason to apprehend some latent vomica; because in many cases of this sort a vomit may occasion great mischief, and sometimes even sudden death. Many persons also of very delicate constitutions from weak nerves, as is commonly the case of hysteric patients, can very ill bear the operation of vomits. To these therefore such medicines should not be given but in cases of great necessity, as seldom, in as gentle a manner, and with as much precaution, as may be. For though there is not such danger from vomits here, as in the cases abovementioned, yet these persons find the shock of them too great for their strength, are often many days in recovering the disorders occasioned by them, and are by no means able to support under a frequent

repetition of them. Upon the like principles, a vomit must be wrong in spasms, and other disorders arising from sudden and violent passions of the minds ; so that whatever the symptoms may be, and whatever occasion such patients may seem to have for a vomit, it should at least be postponed untill the agitation of the blood and spirits is subsided, because while that continues it would add fuel to the fire. A vomit must also be improper, at the time, when the spirits and strength have been already too much exhausted by morbid vomitings.

Thus much being said about the operation of vomits in general, let us now see what particular effects they have on the parts more immediately concerned in the disorder we are treating of.

As the action of vomiting agitates the whole body, so does it more particularly affect the stomach, and the parts that are contiguous to or connected with it. The guts, which are one tube continued from
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the stomach, are often stimulated by a vomit to discharge their contents : which may be partly from the shaking and compression they receive, and partly from a share of the medicine passing down into them. But by mere shaking, perhaps none of the neighbouring parts are more liable to be affected than the liver, both on account of its bulk and situation. For it not only is pressed by the contraction of the abdominal muscles, in common with the other viscera, and receives still a larger proportional share of pressure from the action of the diaphragm, by lying immediately under it ; but has also a large part of its concave surface touching and resting upon the stomach, and is in some sort joined to it by the insertion of the biliary ducts into the duodenum. Hence by vomiting some recent obstructions in the substance of the liver itself may be removed. And that the bile is thereby forced more freely and plentifully through the ducts into the the duodenum, and from thence a part of it sometimes pumped up into the stomach, is

is evident both in the operation of emetics and in morbid vomitings. Therefore, as the gall-bladder and ducts have their natural contents discharged by this shaking, what can be more likely to dislodge, and bring away from thence, any morbid collections formed from a stagnation or degeneracy of the bile; whether they are the dregs of it, in a viscid, or in a loose fabulous state, or it be hardened and cemented into calculi, provided these are not too large to pass the ducts? Nor does this only appear reasonable in theory; but it is also found to be true in fact. We see likewise in some other cases, that the force of vomiting promotes expulsion from other parts of the body, more remote from the stomach than the biliary ducts are. Thus in the case from Dr. Simon beforementioned, that large intestinal calculus, which had lain there so long in defiance of all the medicines the doctor could contrive, was at last brought away by encouraging the spontaneous vomiting with plenty of warm water. The vomitings in nephritic cases, occasioned

sioned by the communication between the nerves of the kidneys, and those of the stomach, often assist the passing of the stone down the ureter. And the vomitings which sometimes happen in labour, may be a means to promote delivery. But in biliary obstructions, how often does a vomit cure a jaundice, by clearing the duodenum and ducts from such viscidities and concretions as stopped the course of the bile through them? Thus we see some patients in a jaundice, where there are no stones, void bile or phlegm almost as viscid as birdlime, either upwards or downwards, or both, in large quantities; who by that means finds themselves freed at once from a fulness, weight, shortness of breath, and great uneasiness at the stomach, and about the region of the liver, with which they were constantly oppressed before, and in a short time after get rid of the jaundice also. And here I would beg leave to add an observation by the way, which I think, may be of use to some of my readers. We sometimes meet with the like load, fulness, and oppression

pression, without a direct jaundice, in patients who have been long troubled with a quartan ague ; for which they have taken a great deal of *bark* to little purpose, for want of due previous evacuations. These patients by a few brisk vomits (for they are not usually moved by gentle ones) have brought up, and sometimes voided by stool also, amazing quantities of very viscid phlegm ; and often bile too ; by which they have been soon relieved of those complaints, and of the ague likewise. Sometimes the ague has gone off by repeating the vomits only, and sometimes a little *bark* has been necessary. Which would then take place effectually ; whereas, before these viscidities were cleared away, they might have taken *bark*, as long as they could live, without any lasting benefit, but more probably to the aggravation of their complaints. I had lately two patients of this sort, one a young man, the other about fifty. The former had been afflicted with a quartan ague four months, the other six months ; and both brought very low and weak

weak by a constant uneasiness, and loss of appetite. They both complained more of the fulness, load, and great oppression, at the stomach, and about the region of the liver, attended also with some swelling there, than of the ague. I began the cure of both with vomits, which appeared to me to be the only proper remedy. To the young man I gave *ipecac. ʒi tart. emit. gr. ij.* Which having no effect, not so much as moving him at all either upwards or downwards, I next gave him *vit. antimon. cerat ʒß.* This operated powerfully both ways, and brought away an immense quantity of yellow bitter viscid humours tenacious almost as birdlime; by which he was greatly relieved; and by repeating the dose once more, with the like effect, his complaints were all removed. The ague indeed soon returned, but without any uneasiness at the stomach, and very readily yielded to ten drams of *bark* joined with *aromatics* taken in one intermission. To the other patient I gave *vit. antimon. cerat. gr. viij.* then *gr. xij.* and then *ʒi.* Neither of these doses vomited

vomited him, or had any effect, unless it was to give one stool, perhaps twelve hours after it was taken. Therefore, I gave him *ipecac. ʒi. tart. emet. gr. iv.* for a dose, which had a full effect both ways, and discharged such contents as in the former case, and with the like relief. This vomit was repeated several times, at three days distance, on the second day after the ague, when he was best able to take it, in hope of curing the ague by that means only. But the ague continuing obstinate, though all the other complaints were removed, the *bark* was given in the same way, and with equal success, as in the former case. And by repeating that quantity of the *bark*, only once, joined with *steel*, to be used in eight or ten days, taking a dose twice every day, both patients were effectually cured : which could not have been done by any quantity of *bark*, without first clearing away that bitter tenacious oppressive load. Another time I tried to cure a young woman of a long quartan, by repeated doses of the *vitrum antimonii ceratum*. I began

began with *gr. vi. vel viii.* and increased the dose to *gr. x. xv. xx. xxv.* which last was the largest dose I ever gave of that medicine. At first it operated in its usual manner, but at length came to have no effect. The last dose but one or two, neither vomited nor purged, nor made her sick, but sweated her, and the last dose had no sensible effect at all. I then thought it time to leave off that medicine, and, as the quartan continued just the same, to have recourse to the *bark*, which was given with the like happy effect as to those two other patients. Nor have I ever seen the complete cure of an obstinate quartan from this antimonial medicine alone, which Monsieur Geoffroy * says he has several times known. That it prepares the way for a speedy and effectual cure by the *bark* I am fully satisfied; but whether better than some other vomits, as often repeated, I cannot say. And of its good effects in some other diseases I am sensible from long experience;

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* Philosoph. Transact. for 1751 and 1752. vol. xlv. pag. 277.



as I used it early, upon receiving a letter about it from my very worthy and judicious friend Dr. George Young at Edinburgh, long before there was any account of it in print, except what he generously and humanely published in the newspapers as soon as he himself was convinced of the efficacy of the medicine. But to return from this digression to our subject. And besides the viscid humours which vomits bring away from the biliary passages, how often, in icteric cases, are gall-stones likewise found in the stools after the operation of a vomit? How much oftener would they be found, if a proper search was made for them upon the going off of icteric symptoms, or after strong vomitings in such patients, whether they proceed from the disorder, or are procured by medicines? I always order a very careful search to be made at the end of a fit, or from the first loose stools after a vomit has been taken: which stools, to many of these patients, do not happen till after a purge has been likewise given, though in other diseases it is so common for vomits to open the
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body. And I have often had the satisfaction of having the stones found, and not only in loose stools, but sometimes also in solid ones. It seems, therefore, strange to me, that Bianchi, Hoffman, and Van Swieten, who are almost the only writers I have seen that treat very particularly of the cure of these calculi, should not prescribe vomits here, as well as in some other jaundice cases. Yet Van Swieten speaks of encouraging the spontaneous vomitings, *dum molestissima illa symptomata urgent*, that is, in the fit, as I call it, by large quantities of barley-water and honey; and he says, there is nothing better, both to make the patient vomit easily, and to prolong the vomiting. He adds also, *salubre enim hoc naturæ molimen conducit quam optime, ut loco suo moveantur calculi.*—

How comes it then, that this judicious practitioner should never think of assisting further, by a little *ipecacoanha* at least, if his diluting liquors were not sufficient; or of imitating this kindly effort of nature, by giving a vomit when the spon-

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taneous vomitings had ceased for a time? Can there be any clearer direction of nature to guide us in the cure? I have often given vomits in this case, and, I think, I have more reason to be satisfied of the effect of them in dislodging these calculi, than of any other, or indeed of all other, medicines. Vomits seem to be most proper while the case is recent, or at least comes by fits; because there is then reason to hope, that the stones are moveable and not large, that if any are newly fallen into the duct, they may not be firmly fixed, and therefore may the more easily be dislodged and expelled. Whereas when the symptoms are of long standing, and the jaundice has continued without intermission, it may be suspected, either that a stone is immoveably fixed in the duct, or that the bladder is filled with one or more large stones, or with a great number of small ones, so wedged together, that they cannot by shaking be separated, and brought away, till time, and change of constitution, or a long use of some aperient alterative medicines, have
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in some measure dissolved their union. In such a situation we are to forbear the use, or at least the repetition, of vomits; which would not only fatigue the patient to no purpose, but might do harm by irritation: as, for a like reason, we avoid every thing that stimulates too much, when we suspect a large stone in the kidneys. But in recent cases vomits seem to be proper for all, unless weakness, or some peculiarity of constitution, or a complication with some other disease, or some other particular circumstances, forbid the use of them. When bleeding is necessary, that doubtless ought to be done before a vomit is given, as well in this, as indeed in all cases which require both. And if a fever and inflammation attend, I hardly need to say, that the vomit should be postponed at least till they are removed: though indeed, the case we are treating of is supposed to be without them, according to our doctrine in the chapter about the signs. When nothing forbids, I generally begin with a vomit; unless long costiveness inclines me first to

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take off the pressure of the loaded guts, by a glyster or some purging medicine; or I find my patients so much fatigued with spontaneous vomitings, and their strength so much exhausted, as not to be able to bear it at that time. In which last case I give an opiate first, to take off the spasms and fruitless sickness, and to recruit the strength: as I also do after the operation of the vomit, if I find it necessary on account of pain, or to settle the stomach and compose the hurry of the spirits occasioned by it. Vomits are to be repeated at discretion, if occasion requires, once in four or five days, or a week, or more: and especially if we see them successful in bringing away calculi, and have reason to conclude, both from the symptoms, and from the appearance of the calculi, that there are more behind; because then we shall have reason to hope, that, by repeating the operation, we may in time get the whole quarry cleared. But if, after two, or three, or four vomits, no stones are voided, it may be proper to desist from the use of them,
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at least for a while, especially if the patient suffers much from them; and to have recourse to other medicines, in hopes of making such alterations, as may prepare the way for a more easy expulsion afterwards. When, by the disappearing of all the symptoms, there is reason to think, that all the stones are discharged, or at least when the patient has been a good while free from all complaints, (for from what has been said in the chapter of the signs it is not easy to know when they are all come away) I think it may be of great service, in order to prevent the breeding of more, that the patient should take a vomit and a purge once in a month, or six weeks, for a year at least, or till there appears to be such a change of constitution, as to make it probable that the disposition to breed them is removed. This seems to me to be one likely means, among others that may be used, to prevent the concreting of new calculi, even while a disposition to breed them remains. For it will help to make the circulation of the bile more free, and to clear

gall-bladder and ducts of gross bile, or the dregs of it, which, if they continue there, would form into calculi. Or even if any should be concreted, it may bring them away before they are grown either large or numerous. But though this method may appear so easy for persons in present health to comply with, in order to prevent the return of so painful a disease, yet I do not remember one patient, that ever I could prevail with to persevere in it for any long time after they thought themselves well. There is perhaps no disease, in which patients are more apt to despair of a cure than in this, while the violence of the fit is upon them; nor any, so far as I have observed, which they are more ready to forget, as soon as the pain is over. At least they so far forget it, as to flatter themselves in a vain security, that they shall have no return; and therefore become negligent of the proper means to prevent it. Which is the more surprizing in those who have had many fits, since they might, from their own experience, be led to

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to suppose, that they are no more secure now, than they were in former intervals. And if ever they have been informed what the case really is, and have seen the stones come away, they might be convinced, that they can never be free from danger of future fits, so long as there are any stones left, or there remains a disposition to breed more. Persons troubled with the urinary calculi are not, I think, near so apt to deceive themselves with false hopes, nor so hard to be persuaded, to enter upon a long course of medicines, with a view to eradicate that disease. With how much faith and patience did many people enter upon, and for a long time persevere in, that tiresome and nauseous method prescribed them by Mrs. Stephens; which consists of such an immense load of drugs, as was hardly ever given before upon any occasion, and perhaps would never have been submitted to from the advice of any physician, or even from the direction of a whole college? And yet, perhaps, the chance of a complete cure is, upon the whole, greater in the

case of biliary stones, than in that of the urinary kind, even after all our new discoveries about a plentiful use of *soap* and *lime-water*. Of the former sort, those which are passable come away more freely, when the way is once made. And it is well known, that much larger stones have passed the biliary ducts, than ever did or can pass the urethra, in men at least. The only advantage in favour of the urinary stones is, that those of the bladder, which are too large to pass, can be cut out. But then, perhaps, there are not near so many, in proportion, of the biliary kind, that are too large to pass by proper help. And as to the disposition to breed more of either sort, when they have been once cleared away, it seems to be full as easy to mend the bile, and prevent its future stagnation, as to alter that less known state of the fluids, which breeds the urinary calculi. The reasons of this different conduct in the two cases may be, that the biliary stones are a new thing to most patients; many of them at least not having heard of such a thing,
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till it comes to be their own case; and they are not so sensible of the situation, the nature and consequences of them, as of those of the urinary kind. Therefore, though they have suffered greatly in a fit of biliary stones, yet, when they are well, they are apt to hope they shall have no more, or, if they have, that they shall get rid of it again. And besides, it is often difficult to persuade them, that the whole of the case is owing to the stones. They are apt to imagine, that a part at least is from what they reckon a common colic. Whereas every body knows something about the urinary stones, which, when they come away, are seen without any trouble in searching for them, and therefore the case cannot be mistaken; and most people also know, that, when there are large stones in the bladder, there is danger of pining away with long continued pain, or else of being obliged to undergo that terrible and hazardous operation of cutting. Therefore, to avoid these known consequences, they submit

submit to a long course of medicines. But not being aware, that they are also liable to be worn out with lingering pain, or to other fatal consequences, from large biliary calculi, and being less alarmed at danger told them by their physicians, than at a single instance or two of any disease which they have seen themselves, or heard from some of their acquaintance, they lull themselves into a blind security, and neglect the means intended to preserve them from all these future mischiefs.

As to the kind and strength of vomits, they should be proportioned to the strength of the patient, to the facility or difficulty of his disposition to be worked upon by medicines of this sort, and to the circumstances of the case. To some *ipeacacoanha* alone is sufficient; but I more commonly add to it a grain or two, and sometimes more, of *emetic tartar*, or else give a dose of *vinum-antimoniale*; as it is well known, that, in general, icteric cases require pretty

ty strong vomits, both to overcome the inertia of the fibres of the stomach, and of its contents, and to dislodge what obstructs the course of the bile; whether the obstruction be owing to concretions, or to viscid humours in the ducts themselves, or the duodenum is so loaded with these as to stop the orifice of the duct, which should open freely into it. It may, however, be right here, as in most other cases, to feel our ground as we go; to begin with a moderate dose, and to increase it in the repetition of the medicine, as the patient can bear it, and as the obstinacy of the case may require.

After a vomit, purging comes next in course. Purging medicines are proper to bring away what may have been dislodged from the ducts, and forced down into the guts, by the shaking of the vomit; or to join their operation, and to assist in dislodging the calculi, if the vomit has failed of that effect. They are also necessary to open the body, and discharge
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the dry hardened fæces, which are moved so slowly, and pass with so much difficulty, for want of the natural assistance from the stimulus of the bile. For as a jaundice may happen without calculi, from the duodenum being loaded with such contents as stop the orifice of the duct, or from the colon stuffed with hard fæces pressing upon the duodenum and ducts; so in a calculous jaundice a like distention of those bowels must aggravate the disease, and prevent the dislodging of the calculi. Therefore in the former cases emptying these bowels may perform the whole cure at once; and in the latter it must contribute towards the cure, at least so far as to remove one impediment to it.

The calculi are generally discharged with loose stools, whether from purging medicines, or a spontaneous diarrhœa, which often happens from a plentiful flow of bile into the guts, after the obstruction is removed. When they are found in the stools after a purge has
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been given, patients are ready to impute the cure to that medicine; though very often the stones were dislodged before, and the purge acted no further upon them, than to hasten their passage along the intestinal tube, and their expulsion out of the body. Nevertheless, it must be granted, that strong active purges are capable of assisting in dislodging them from the gall-bladder and ducts, even without proving emetic too, as those of the rough kinds often do; and more especially when the stones are small and lie loose, and the ducts have been enlarged by others passing before. The stimulus of a brisk purge vellicates the fibres, and quickens the peristaltic motion of the whole tube, and must of course affect all the outlets which open into it; besides the effect that some sorts of purges may have upon the blood and other humours of the body. Accordingly we see, that a large quantity of bile is frequently evacuated by stool in the operation of a purge; and calculi also have been voided at the same time, even when no vomit or other stimulus

mulus has preceded the exhibition of the purge, and sometimes too when its operation has not been violent. In the first of Dr. Frewin's histories, above a hundred calculi were brought away by the first purge, and many by the second and third. How large they were the doctor does not say; but from the number of them, and from their easy discharge, we may conclude they were small. And probably they had made their way into the guts before the purges were taken, and were only brought away the faster by the operation of those medicines. For the patient voided some stones almost every day for five weeks, though she was during that time for the most part free from pain, and without any repetition of purges, so far as appears; and continued to void many for along time after, while she used the *sea-water*. So that the duct seems to have been open, or at least easily dilatable; and perhaps had been so long before she consulted the doctor. And, as she had had many returns of her pain and jaundice, a great number
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ber of stones might have passed unobserved, for want of searching the stools ; which, not suspecting the true cause of the complaints, had not been done, till she received directions from the doctor for that purpose. However, by following the method prescribed for her, she seems to have obtained a complete cure, having been so long free from any return of her disorders at the time the doctor wrote. But much more surprizing is that story of Bianchi, before referred to, of a very large calculus, bigger than a walnut, brought away from a lady by one strong purge. She had been subject to a very deep jaundice, returning periodically every month, and lasting for twelve or fifteen days at a time ; which was indeed suspected to proceed from a stone in the gall-bladder. Having lain in, at the end of four weeks, a strong purge was given her ; which occasioned a most violent superpurgation, together with enormous pains, spasms, and strainings both upwards and downwards. By this rash advice she got an accidental and unexpected cure. By

those excessive and dangerous agitations, and evacuations, that large stone was brought away; the jaundice went off, and did not return. Our author seems to think, that this great stone was forced away from the bladder all at once, by the violent operation of the purge. But I should rather suppose, that it had been making its way at times, in those frequent fits of the jaundice, by a gradual dilation of the duct; towards which probably the triangular shape of the stone might be of some advantage; though, perhaps, it might never have got through without some such violence: for I cannot conceive, that the duct could be stretched to such a degree in so short a time. But whether the purges are gentle, or moderate, or rough, it is but rarely that such effects are produced by a single dose, even when the stones are much smaller than this; and especially when no previous preparatory medicines have been used. There is commonly occasion for a repetition of purges, and the assistance of other means between dose and dose; and

and too often, if the stones are large, or obstinately fixed, all our endeavours prove in vain. But indeed, as I observed before about vomits, when we have reason to believe, that the stones are too large to pass the duct, we are not to persist in the use of purgatives, especially of the rougher kinds, but to rest the care of the patient on palliatives, and gentle aperient alteratives; waiting to see, whether these can in time produce a favourable change in the case, which may afford us room to endeavour at further assistance from purges. In common cases I usually give a purge the next day, or the next but one, after the vomit. If the patient has been much fatigued by the vomit, or if it has also worked downwards and given a stool or two, (which last is an effect of a vomit that I generally like in any disease) I always omit a day between that and the purge. And in cases, where, for one reason or another, vomits cannot be given at all, we must supply the place of them by purging, as far as we can. The kind of purges, the form of them, the dose, and time of re-

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peating them, must be determined by the circumstances of the case, and by the strength and constitution of the patient. When it will suit the constitution, *calomel* seems to be a good medicine, either mixed with purgatives in the form of pills or bolus, or given over night and the purge the next morning. I sometimes use the several sorts of purging pills, and sometimes I give potions, either of *rhubarb* or *tinctura sacra*, or an infusion of *sena* with *manna*, or with *syr. de spin. cerv.* or with some of the purging *salts*; or else perhaps only a solution of *manna* and *salts*, with some *elixir salutis* added to it. And for some patients *ol. amygd. dulc.* may be properly joined with purges. Or it may be given by itself some time before, to lubricate the bowels and soften the fæces, and thereby facilitate the operation of the purges. If any of these potions are too weak, in such quantity as the patient can take, they may be quickened with a little *pulv.* or *tinct. jalap.* or with a grain, or two, or three, of *tart. emet.* Sometimes I have seen these patients, as also
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those in a recent jaundice without calculi, extremely difficult to be moved by purging medicines. Infomuch, that after being disappointed once or more, notwithstanding the help of clysters too, I have been obliged, upon the repetition, at a proper distance, in as strong a dose as I dared to venture upon at once, to order a purging mixture also to be at hand; which, if the dose did not answer in a certain time, was to be given by two or three spoonfuls every hour or two, till the desired effect was obtained. *Mineral purging waters* may sometimes do well, for patients that can bear to drink a large quantity, and are moved by medicines of a gentle kind, either drank alone, or quickened with some other purging ingredients.

Another use of purgatives is to give some of the milder sorts, such as *rhubarb*, *aloes*, *salts*, especially some of the soluble preparations of *tartar*, either singly, or mixed together, in such manner as to prevent costiveness between the times of di-

rect purging, and thereby in some measure to supply its place. And these gentle medicines may perhaps, besides keeping the body open, which ought always to be done during the cure, act also as alteratives; or being joined with alteratives, as suppose *rhubarb*, or *aloes* with *soap*, &c. they may increase the effect of each other. The *vinum antimoniale*, given in such small doses as just to keep the body properly open, may also do well with some patients. Whether from its attenuating qualities it has any peculiar virtue in these cases, either towards the cure, or to prevent the formation of new calculi, I must refer to time and further experience. For the purposes above mentioned *sea-water* also is recommended by Dr. Frewin in this disease; and the patient he gave it to continued to void many calculi, and to recover health during the use of it. And Dr. Lewis, in that judicious and elegant history of a jaundice, in his epistle to Dr. Ruffel†, expresses an high opinion of the virtues of this water in biliary obstructions.

† Vid. Dissert. de usu Aqu. marin.

tions. Whether there were any calculi in that patient's case does not appear; but some of the symptoms look like it, and there might possibly be some small ones which were unobserved in the stools, as very often happens from want of due care or perseverance in searching. Though indeed, the whole case may be accounted for from that very large quantity of viscid bile, after the discharge of which the patient was soon well. In what manner the sea-water may act upon the biliary ducts, further than as a gentle diluent purge, I shall not take upon me to explain. It may however be observed, that neither of these eminent physicians chose to trust to it alone; but both of them wisely joined the use of other medicines at the same time. For the virtues of *sea-water* I refer to Dr. Russel's learned treatise on that subject; who also says, that he has very often seen it do good in icteric cases: and both he and Dr. Lewis quote Celsus for the like practice.

Clysters are another remedy, which may be very useful in the fit, either to assist the operation of † a purge, or to procure stools when no purge has been given, or can be retained in the stomach; and also as an internal fomentation to lubricate and relax the guts, and by that means in some measure relieve the parts that are connected with or contiguous to them. The benefit of clysters is universally allowed in some kinds of colic, and in a fit of the stone in the kidneys and ureters; they are likewise sometimes very serviceable in several respects to women in labour; and doubtless they have a proportional use in the disorder we are treating of. In this case, when they are used with a view to relax, they should be
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† Perhaps Dr. Woodward's method of practice (which he was so fond of, and, as appears by a posthumous volume of his *Select Cases* lately published, used so generally in almost all diseases) may sometimes be proper in this case. The method is to give oil of almonds the day before, and a clyster half an hour after a purge is taken, or at least before it begins to operate.

given in large quantities, or two or three one after another, so that as much liquor may be injected, as the patient can well bear the pressure of, and be able to retain. And they are to be repeated as occasion requires. *Common whey*, or *water-gruel* with *mallow roots* boiled in it, are liquors proper for this purpose. To which may be added a little *oil*, if it is not found, by its slipperiness, to bring away the clysters too quickly.

Partly also with a like intention, when the patient is upon the rack, and needs all manner of help, we have recourse to external fomentations; whether merely *topical*, with hot *flannels*, or with a *large bladder half filled with warm water*, applied to the part affected, or a more general extensive one, by a *warm bath* for the patient to sit in. These I have sometimes ordered with advantage. And it is well known, that in some violent colics, and in nephritic cases, their efficacy is such, that they are seldom used without affording, at least, some immediate temporary relief;

relief; besides, that they also assist the operation of other remedies. When clysters can be retained at the same time that these are used, it seems probable, that joining the forces of the external and internal fomentations together may increase the effect of both. In some cases some other external applications may be very proper, especially, perhaps, when there is a tumour perceived in the hypochondrium, such as *liniments*, *plasters*, &c. Hoffman is particularly fond of *warm bags* filled with emollient and carminative ingredients in this case, as well as in colics and other internal painful disorders.

And while we are using all these external means, it may be right also to give the most soft lubricating things inwardly, both in the form of medicines and as common drinks; in like manner as we do in cases of calculi in the urinary passages, in order to assist in relaxing the fibres and easing the pain. Of this sort are emulsions of *sperma ceti*, *oleum amygdalarum dulcium*, either by itself, or in a mixture
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with some smooth syrup, &c. infusions, decoctions, emulsions, made of emollient herbs, roots, seeds, fruits, &c.

But of all remedies, external or internal, designed to procure ease in the extremity of the fit, there is nothing comparable to *opium*. This seems to be of absolute necessity, as well to check the enormous long continued vomitings, and enable the patient to retain other medicines, or even food itself, as to take off the spasms, and abate the intolerable pain, to support the spirits and strength in some measure, and even life itself. I have often seen patients in such extreme agony, that I have thought they must sink under it, if they had not some speedy relief. In such a storm as this *opium* is the sheet anchor. Therefore I give it freely, and repeat it as occasion requires, till it produces an abatement of the pain. A small dose will do no good in such excessive agony, unless perhaps in some particular constitutions, that are very easily affected by it. Solid
opium

opium is, I think, to be preferred here, as also in other cases that are very urgent, and where a disappointment would be dangerous; both because the dose is more determinate than of *liquid laudanum*, and also because the small bulk of it in a pill can often be retained in a sick stomach, when the tincture given in any vehicle would be thrown up. I usually begin with a grain (though sometimes perhaps I may try half a grain first) or a grain and half, or two grains, according to the degree of pain, the constitution of the patient, and other circumstances. And if the first dose fails, I order the medicine to be repeated with care and caution, in smaller quantities, suppose a quarter or half a grain, at proper distances, till it answers. And indeed, in this case, which I rarely do in others, I trust my patients, or rather some prudent person that is about them, if they are at a distance both from me and from the apothecary, with several doses of *opium* in their own possession; to be used with discretion, not only to ease the

present pain, but to have recourse to, if it should return with violence. On the like accounts the use of *opium* is well known in cases of the stone in the urinary passages. For though, as has been said before, the vomitings may help to propel the stone from the kidneys to the bladder; yet when the spasms are excessive, besides that the patient is not able to support himself under them, they may cause the stone to be grasped the faster, particularly if it be large, or ill shaped, or is in a wrong position; and therefore *opium* is necessary, to take off such spasms, and relax the fibres, in order to facilitate the passing of the stone. *Opium* may also be sometimes necessary for women in labour, when the pains are too great for the patient's strength, and the delivery is not near at hand; and more especially if there be also some pains of the spurious kind, which tend rather to contract, than to dilate, the orifice of the uterus.

Although I have said so much in praise of *opium*, when properly used, I cannot help adding, that nothing is capable of doing more mischief in ignorant hands. It is a very dangerous medicine to be left with patients or their attendants, except with very discreet persons, and under very clear and full directions adapted to the particular circumstances of every individual case and patient. How much therefore is it to be lamented, that there are any preparations of it retailed to the common people, under the name of such a *Dr.'s cordial*, and such a one's *drops*, &c. which they buy and use to the unspeakable injury of their young children, and often of adults? How dangerous must *opium* be to tender infants, unless used with great judgment and caution? How unfit a medicine then is it to be in the hands, and at the discretion of ignorant nurses? Many an infant suffers by it from the hands of its tender but ignorant mother, who cannot bear to hear it cry; and perhaps many more from the laziness

ness or negligence of nurses, who often quiet the child by *opium*, to save their own labour and watching, or that they may employ their time some other way. So that it is justly to be feared, that great numbers of young children * are destroyed, and that many others have the faculties both of body and mind greatly enervated, by quack medicines of this kind. What terrible consequences are also to be expected from them, when given to adults in some inward pains, or restlessness, arising from fevers, and from inflammations, particularly of the lungs, by increasing the fever, stopping expectoration, and suffocating the patient? When the vulgar only trifle with idle insignificant things, that can do neither good nor harm, it is a lesser evil; it is only neglecting the proper means of help; and the

* If a true account could be had of the proportion of children dying under two years old, who had been used to these quack-opiates, and of those who had not, I make no doubt but the facts would too strongly confirm this doctrine, and fully demonstrate the great destruction of the human species made by this one kind of patent-medicine only.

the patient has some chance (nay often a very good chance in comparison with following unskilful advice) by leaving the disease to nature. If he dies, they do not directly kill him. But when they come to use edged tools, and are not aware of the edge, the consequences are dreadful. And this is the case when they use *opium*.

Having said thus much about evacuations, and some other remedies, which have a sensible effect towards expelling the calculi, or relieving the pain; we proceed to speak of some other medicines, whose operation is less evident, or at least more slow and gradual. Some of these, being supposed to change and correct the vitiated humours of the body by degrees, are therefore called alteratives; and others, being thought to have a more peculiar efficacy in disorders of the liver and bile, have been reckoned specifics * in such cases.

And

* Boerhaave says, in his *Institut. cap. de hepatis actione*, sect. 350, that there is not greater difficulty in curing

And here we should have a large and wild field to wander in, if we were to take particular notice of all those, which, for one reason or another, or from prejudice and whim, without any reason at all, have been recommended, and handed down by traditional writers, one after another, as remedies in icteric cases in general; or even of all, which are mentioned

curing the diseases of any particular part of the body than of the liver, by reason of the peculiar laws of circulation in this organ; by which the medicines are to be carried a long round about way, after they get into the blood; that is, through the arteries of almost all the viscera abdominalia, and back again by their corresponding veins, before they arrive at the vena portarum. But, perhaps, it is not so easy, to send the other tribes of specifics, as they are commonly reckoned, such as cephalics, pectorals, nephritics, uterines, nervous, &c. through the several offices of digestion, and the common course of circulation, to the respective places of action allotted to them, with their virtues not at all or but little diminished, as is generally thought. And if any part of the hepatic medicines can be taken up by the meseraic veins in the cavity of the guts, (as some have supposed) and be by them carried immediately to the liver, is not their way more short and more direct, than that of other medicines, designed for the service of the other viscera, by the lacteals and the ordinary course of the circulation?

tioned by Hoffman, and Bianchi, under the cure of biliary calculi. It is not at all strange, that the vulgar should be amused with the greatest trifles under the name of remedies ; that they should believe, that almost any thing of a yellow colour must be good in a jaundice, even a *tench* outwardly applyed because it is a yellow fish ; that a jaundice may be cured by a little powder of *goose-dung*, or of *earth-worms*, and the like ; or by swallowing nine *lice* for six mornings successively ; or by tricks played with the patients urine, &c. But that such things should be at all credited by grave and celebrated physicians, so lately as in the last century, and that these learned men should report such sorts of cures, and labour at the etiology of them, seems very surprizing. Can we wonder at any charms, or ridiculous pranks played by the vulgar, after reading such things recorded by learned men, as curing the jaundice *per transplantationem*, which was to be done by the patients pissing upon an * ant heap ;
or

* Ephemerid. academ. natur. curios. Dec. I. Ann. III. Observ. 89.

or of the *cura sympathetica*, by giving to an hungry dog cakes * made of the recent urine of the patient and wheat-meal? Or can we forbear astonishment to find the late famous Hoffman, so few years ago, advising the powder of the *elk's hoof*, and of *a young hare cut out of the dam's belly*, as remedies against the convulsions occasioned by these biliary calculi? Is it not evident, that the proper cure of such convulsions is bringing away the calculi, or at least taking off the irritations and spasms occasioned by them? Can we fail to be amazed, that so great a practitioner could, upon any authority, even that of his father, whose book he quotes, be brought to imagine, that one single dose of half a dram of *curcuma* could ease the most violent pain, and expel calculi from the biliary duct and quite out of the body within two hours? Should he not rather have concluded, that the stones were actually passing the duct when that dose was given, and that some of them had passed it long before, either by the efforts of nature, or by the help

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* Ibid. Dec. III. Ann. V. & VI. Observ. 160.

of the other remedies that had been used; and that the pain ceased, not from the virtue of the medicine, but because all the stones had by that time passed the duct, as they would doubtless have done if it had never been taken? The vulgar are apt to call every recovery a cure, and to impute it to the last thing taken as a medicine, especially if it was of their own prescribing, whether it has any virtue or not; and to overlook all the means used before, though they perhaps have been operating gradually, and have at length produced the effect, which this last thing unjustly obtains the credit of. But surely a physician should judge better, and be very cautious of ascribing effects to inadequate causes, and much more to improbable and absurd ones. Has *curcuma*, especially in one such single dose, any sort of claim to the credit of such a cure, either from any anodyne, aperient, relaxing, stimulating, or any other qualities *?

But

* I do not say, that *curcuma* has none of these qualities, or that it has no virtues in this disease: but that it has not such efficacy as is ascribed to it in the story here recited is, I think, sufficiently evident. What its
real

But leaving these imaginary sorts of remedies, let us go on to such as have some degree of probability, either of dissolving the calculi, or of relaxing and enlarging the ducts; of mending the bad state of the bile, and of preventing the consequences of its regurgitating and mixing with the blood. We are not indeed to expect, that the virtue and operation of many kinds of alteratives should be so evident as of evacuating and anodyne medicines. But then we should not place too great a dependance on any medicines of doubtful efficacy, either in this or any other disease; or be fond of giving the name of alterative medicines to any, but

real virtues are, either in icteric cases, or as an emmenagogue, on both which accounts it has been much commended by some authors, I cannot take upon me to say. That it is somewhat aromatic is plain to the smell and taste; but that it is far exceeded in this quality by *zedoary*, and many other drugs, we likewise learn in the same way. And that it may be used pretty freely without fear of its being too powerful, I am persuaded from having taken it myself, for experiment sake, to a dram at a dose, in powder, three times in a day without any very sensible effect. Hence therefore I have been apt to suspect, that, when it is given in a jaundice in small doses, as has been done by many, very little good is to be expected from it.

such as seem to have, at least, a probable title to it, either from their nature and sensible qualities, or from manifest experience of their effects.

Whether these stones can be properly dissolved, or not, after they are grown hard, or are covered with the crust beforementioned in the description of them, I will not take upon me to assert. But when many small stones adhere together, by touching in a few points, making the appearance of one large stone, which is well known by opening bodies, and by the shape and surface of many that are voided, to be often the case; since we are assured, that this adhesion may sometimes be broken, either by the efforts of nature, or by the shaking occasioned by strong stimulating medicines, such as vomits and purges, or by violent exercise and motions of the body, &c. and that the small stones so separated may be capable of passing the ducts; it may not be unreasonable to suppose, that such medicines as can alter the state of the blood, and of the bile, may also help to dissolve this adhesion or
union,

union, when the stones are but slightly joined together. And that some of the softer stones may even be dissolved, and reduced into a fabulous state, may not seem improbable; both from the friability of some stones, which, though they come away whole, are so weakly cemented, as hardly to bear a gentle touch without being crushed to pieces; and from the sandy grit and fragments, which some patients have voided after a long course of alterative medicines; and also from what Glisson says about concretions in the biliary ducts of the horned cattle. These, he says, are formed in the winter, when the cattle have much less motion than in summer, and are fed with dry food; and are dissolved again in the beginning of summer, and discharged, by the help of moist food, (the young succulent grass always producing a purging) and by moving freely about the pastures.

Van Swieten's method of cure seems to be chiefly by alteratives, and those not very numerous nor much compounded,

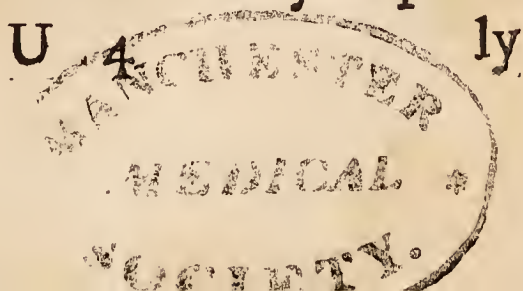
but to be taken in large quantities, and to be continued for a very long time. In the winter he gives *Venice soap* very plentifully, with a decoction of the *five opening roots*. In the spring he orders the juice of *grafs*, and a decoction of it along with some of the saponaceous lactescent plants; or else in the room of these, he proposes large quantities of *whey*, six or eight pints in a day, which he says, has all the virtue of the *grafs*: but if the patient is not able to drink so much, (as perhaps very few can) he makes a strong decoction of *grafs* and the plants above-mentioned in *whey*; to a pint of which he adds half an ounce of *sal polychrestum*, and directs it for three doses to be taken every day for three months. And in the hot months of summer he advises *Spaawater* to be drank freely. Thus, he says, by a long perseverance, he has known many obstinate cases cured, and mentions some remarkable instances. One of which was an old lady, who continued in an uninterrupted course of these remedies for two years, even though for the first eighteen months she found no benefit.

The method may be good in such constitutions as can well bear it, when it is used with a view of attempting to dissolve large calculi that may be soft or friable, or to reduce them into a fabulous state; as also to loosen the cement of those which adhere together in some points; or where other means have failed. But so far as I have had experience, there are very few patients, who would have resolution enough to submit to it, though their cases were ever so desperate; and perhaps not many whose stomachs or guts could bear such quantities of liquor, or such doses of *sal polychrastum* continually repeated for so long time. And where the stones are small and loose in the bladder, such a long course is not often necessary.

As to *soap*, it is a thing almost universally approved of, and prescribed, in icteric cases, as well as in some obstructions of the other viscera, particularly in calculous disorders in the urinary passages. He orders it to be taken freely, as perhaps it should be in many other cases, if the stomach can bear it. The action of *soap* in this disease may be part-

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ly in the primæ viæ, and partly after it enters the blood. In the primæ viæ it may help both to dissolve the viscid contents of the stomach and duodenum, thereby in some measure supplying the place of the deficient bile, and also to lubricate, and at the same time to deterge and stimulate the mouth of the duct, which opens into the duodenum: as when soap is put into clysters, it both lubricates the passages, and by its acrid quality stimulates the fibres to expel the fæces. When the *soap* is got into the blood, it is supposed to act by attenuating viscid humours, and so to remove obstructions of the viscera. That the blood, in some states of it, can bear a long and free use of *soap*, is evident from the large quantities, which have been taken by many persons labouring under the stone in the urinary passages, and also by some icteric patients. But that a liberal exhibition of it may not be proper in every state of the blood seems highly probable. Thus in an inveterate jaundice, when the blood has been long loaded with bile, and is thereby so much dissolved, that
hæmor-

hæmorrhages or a dropfy may be suspected to be near at hand, may not the acrimony of a large quantity of *soap* be supposed to promote a further dissolution, and to hasten those events? In like manner may not a free use of *sal cornu cerui* be dangerous in such a state of things, tho' it may be good in some cold sluggish jaundices, that are recent, or at least have not continued long enough to render the blood acrid, or to bring on an hectic heat? Is not therefore the proper time for using *soap* in large quantities, either while the biliary obstructions are recent, or at least do not occasion a long continued jaundice, but only short though frequent returns of it, so that there is not time for the blood to be much dissolved? Whether indeed *soap* alone, in any quantity, can dissolve stones that are fully formed in the gall-bladder, I will not say: but is there not some degree of probability of its doing good here, if its effects on the urinary calculi are so great as is commonly supposed? If it can help to prevent their increase, or the formation of more, is it not well worth using? And may it not

not be commonly right in a free use of *soap*, to join with it, either some diluting aperient medicines, as Van Swieten's decoction, or *whey* in considerable quantities, or some neutral saline medicines, such as a *julep* with *sal absinth. succ. limon. &c.* or some of the neutral preparations of *tartar*, which may help to abate the acrimony of the *soap*, to correct the bile, and promote the opening of the body by stool?

Grass has been long looked upon as a specific in this case, if taken freely; whether its expressed juice be used, or a decoction of it. The hint seems to have been taken from that observation of Glisson about the horned cattle before-mentioned; and it has been handed down and recommended by Sylvius de le Boe, Boerhaave, Bianchi, Hoffman, Van Swieten, &c. How far the argument from oxen can be applied to men I will not determine. But it is to be considered, that *grass* is to oxen a natural food, which they devour greedily, especially when they first come to eat it in the spring, after being long
fed

fed with dry food in the winter ; that this change to a moist succulent diet fills all their vessels with new juices ; and that it is at their first coming to eat it, that grass most remarkably purges them. It may perhaps likewise be query'd, whether other herbs, or moist food, used as freely, would not have the like effects with *grass* : as also whether our cattle, that are now so much fed with moist food in winter, such as turneps, coleseed, grains, &c. all which help to keep their bodies open, are so much subject to these concretions, as the cattle were in Glisson's time. And as to men, how few are there, who can eat *grass* with the ox, or who can be prevailed upon, to take either its juice, or a decoction of it, in such quantities as to answer any purpose ? Nor does it seem improbable, that other more familiar and more grateful herbs might have as much effect. Some few persons, however, have been persuaded to take the juice of *grass* for a considerable time. Bianchi tells of one woman, who took it for forty days, by which, with the help of one strong purge, she voided a large gall-

gall-stone, and as he reckons, had the others dissolved; at least her complaints were removed, and he gives reasons for supposing there were more behind, after that large one came away. If these things were so, the remedy was easy; and if such effects of the juice of *grafs* were well ascertained by repeated trials, one would hope, that every patient might be willing to use it for so long a time as forty days. But, that a much longer continuance is sometimes necessary, we learn from that remarkable case told by Van Swieten, of a poor man, whom he advised to live almost wholly upon *grafs*, encouraging him by the promise of a cure from it. The man had the patience and resolution, to persevere in a constant use of it for two whole years, a few of the winter months only excepted, when he could get none. He boiled large quantities of it in water, which being sweetened with honey was his common drink; he boiled it also in broth, which was almost his only food. At first he did not like his diet, but time and use made it familiar, so that he could at least bear it without aversion.

aversion. He was so accustomed to it, that he could tell which were the richest pastures by the taste of the *grass*. And he used such quantities of it, that the farmers, when they knew it, drove him from their fields by force, so that he was obliged to get it by stealth. The poor man, however, by this method only, obtained a complete cure of a very obstinate jaundice, which had arrived to such a degree, as our author says, that his saliva was become bitter. Whether he ever voided any calculi, or fabulous grit, we are not told; nor perhaps was it known, either by the doctor or by the patient; but the doctor says in general, that he never knew such jaundices cured without concretions being found in the stools, if proper search was made for them.

From this account of the use of *grass* we may observe, how little benefit is to be expected from a weak decoction of its roots, even when joined with the other *roots* called *aperient*, taken in small quantities, and only for a short time; and
also

also how much more insignificant still, as to any real medicinal efficacy, must that famous *syrup* of the *five opening roots* be, which some people seem to have laid a stress upon. Whereas, if a strong decoction of those roots, especially joined with some of the lactescent herbs, such as *lettice*, *endive*, *succory*, *dandelion*, &c. could be taken in large quantities, and continued for a long time, it should seem that they might have some good effect. Another observation also may be made from the account of biliary concretions in oxen, namely, that a sedentary life, a costive habit of body, and perhaps also too much dry food, or taking too little diluting drink with our food, may probably contribute greatly to produce them in men.

Whey seems to be a good thing for those patients that can bear to drink it plentifully, as it is a diluting detergent liquor, being the thinner part of the milk separated from the more gross oily and cheesy parts ; and therefore probably

bly capable, when taken in quantities, and for a long time, of making considerable changes in the fluids, of helping to attenuate viscidities, and remove obstructions, and perhaps also to dissolve some kinds of concretions. And if it has all the virtues of *grafs*, as Van Swieten says, it is at least much more agreeable, and easy to be taken by most people : nay, many are fond of it as a grateful drink in summer. No doubt its virtues may be increased, by boiling such saponaceous plants in it, as Van Swieten directs ; and of itself it seems to be no bad vehicle, to be used with soap or other solid medicines.

Mineral waters are another remedy of importance in this case. *Spaa*, or *Pyrmont-water*, which Van Swieten prescribes in the hot months, is allowed to be good, to mend an impoverished blood, to dissolve cold viscid humours, and remove sluggish obstructions, to promote the secretions, by scouring and cleansing the glands, and to invigorate the whole body.

Therefore

Therefore may not these waters possibly be able to dissolve some of the kinds of biliary calculi? Or, if they cannot dissolve calculi already formed, may they not at least help to carry off those impurities of the animal fluids, which might occasion an increase either in the size of the calculi, or in the number of them; in like manner as they cleanse the kidneys from gravel, which might be cemented into stones there; and also by strengthening the whole habit, assisting the digestion, promoting a regular circulation, and due secretions, produce a more sound and healthful state of the fluids for the future? With this view at the end of the case, when I had reason to think the calculi were all voided, I have advised either *chalybeate waters*, or *steel* in some other form, as one good means to mend the constitution, and prevent the breeding of more. But besides *chalybeate waters*, those also of the hot springs are esteemed as very useful. Hoffman recommends the warm baths of Germany. And it is common with our physicians,
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in obstinate icteric cases of this sort, to send their patients to *Bath*, both to drink the water and to bathe. By which Dr. Frewin says, he has seen many recover their health.

There are many other medicines recommended by authors in this case, a few of which only I shall take notice of here. Among the rest Hoffman mentions the *pareira brava*, and refers to a case, in the *Memoires * de l'Academie Royale des Sciences*, of a jaundice, attended with violent pain in the region of the liver, said to be cured by a decoction of this root in so short a time as twenty four hours. Whether there were any calculi in that case does not appear from the history, though the symptoms look like it. But whatever was the cause of that jaundice, it is not a little extraordinary, that not only the pain should be removed, but that the stools, which were white before, and the urine, which was so deeply tinged, should

* Memoir. pour l'Année 1710.

both be brought to their natural colour, nay, and even the yellowness of the skin be carried quite off, in such a space of time, by this or any other medicine. These effects seem scarcely inferior to those ascribed to the one dose of *curcuma* before mentioned. However, as this also is a single instance, from which conclusions in physic ought rarely if ever to be drawn, the virtues of the *pareira brava* must be ascertained by more facts, and those better related and supported than this history, before it can deserve any credit, for the cure of biliary calculi, or of any other disease.

Another medicine, that has been long recommended in icteric cases, is the *millepedæ*. They are indeed seldom trusted to alone, but commonly joined with other medicines, and perhaps often with those of more efficacy than the *millepedæ* themselves. How far they can assist in the cure of biliary calculi, I will not take upon me to determine, having never given them for that purpose. But if they

they are to be used at all in this case, I think they should be given very freely, and used fresh; either taken alive, or only bruised, or else made into the form of an expression, and as pleasant to the taste as can be: for as to the powder of them, I suspect, that, in such doses at least as are ordinarily prescribed and joined with other ingredients, it only increases the bulk of the medicine, and of course nauseates the patient the more, to little or no purpose. Nor am I so clear about the effects of the expression, as to place any great dependance upon it alone, without any assistance from other medicines, in almost any disease; because I think the manner of its operation is not very evident. I remember one case of an anasarca, when I was a young man, where I thought this medicine proved diuretic, seemed to do great good, and to have the principal share in the cure. But I cannot say that I have observed the like since. I once took it myself many years ago, and as freely too as it is ordinarily given, but could not be sensible of

any effect, not so much as that it operated at all by urine. It should seem according to Schröder, that some, at least, of the virtues of these insects had been ascribed to them, from their having an imagined similitude in them to some diseases, agreeably to the doctrine of the signature philosophy. Thus he says, † *Ut locus natalis saxosus indicat, ad calculum asellos facere. Ita indicante aptitudine & propensione sese contrahendi, ad convulsiones forsitan non essent inutiles.* Many other drugs also have had their reputation for the cure of various diseases, from the same kind of philosophy; such as the *cranium humanum*, *ungula alcis*, &c. in epilepsies, and other diseases of the head. These very two last named have been left out by our college but a few years, and are still in esteem in other places. But perhaps, no disease has had more medicines appropriated to it upon such principles, than the jaundice, on account of its colour. Thus almost every yellow medicine

† Pharmac. Medic. Chym. p. 863. edit. Lugd. Batav. 1673.

cine has been reckoned good for it : and perhaps the *curcuma* had not been so famous, nor *saffron* itself so much preferred to all other aromatics, in this disease, if they had not been of this colour. What could occasion the tench to be chosen, before all other fish, for outward application, but its golden colour ? Its broth indeed has a quality different from that of most other fish, that is being more gelatinous. But what has this quality to do with removing obstructions, or with correcting viscid humours ? If therefore this broth ever cures a jaundice, as it is by some people said to do, must it not be by its restorative virtue, and by sheathing the acrid particles of the blood in a bilious hectic, after the obstructions which caused the jaundice are removed, acting somewhat like asses milk in other hectic ? And must not the decoction of *hempseed* and *milk* act somewhat in the like manner, if it is so useful in a jaundice as Sylvius de le Boe thought it to be ; or by lubricating and relaxing the solids, if it has any efficacy towards discharging calculi ?

calculi? It is true, the doctrine of signatures or resemblances is with us pretty well exploded, but the medicines that took their rise from it seem not to be quite laid aside in practice. The last edition of our college dispensatory has set a fine example of contracting the materia medica, by expunging many idle superfluous drugs that were in former catalogues; and doubtless every wise physician is often making an index expurgatorius for himself. But to return from this digression. Other authors ascribe the virtue of these insects to their salts, from which they are reckoned to be very penetrating. Nay even Schröder thought their aperient resolvent power so great, that he seldom exceeded a scruple for a dose, and did not venture to continue the use of them long for fear of doing mischief. And Willis, * when he prescribes them from fifty to a hundred at a dose in expression, limits the time of using them, ordering that dose only once in a day at first, and afterwards
twice

* Pharmaceut. rational. Cap. de Ictero..

twice in a day for a week. In which direction he has, I think, shewn much more caution than the nature of the thing required. The salts of them are said by some to be partly of a nitrous kind, but they are chiefly reckoned to be volatile. In what proportion they will yield this volatile salt by distillation I do not learn, nor in what respects it is preferable to other animal volatile salts. Quincy gives a process for distilling them, which he takes from Wilson's Chemistry; but does not tell what quantity of salt can be produced from them. However, if he is right as to the dose of it, which he says is from four to sixteen grains, (and I do not doubt but it might be safely given in such doses if we had it) and if all the virtue of the *millepedæ* lies in the volatile salt, as some suppose; it may, I think, be granted, that the doses usually given, either in powder or in expression, must be but trifling. Though, doubtless, there will be more salt in a moderate dose of the expression, than can be contained in nine *lice*, which

are likewise supposed by Willis and others to act by their salts. These odious vermin, indeed, are not, I believe, now used; except by some of the lowest of the vulgar; and perhaps even such people would lay this remedy quite aside, and be deterred from giving it any more, if they were to read a strange story told by Thomas Bartholin, * of a boy, who swallowed *lice* to cure a jaundice. The author says, the disease soon disappeared; but there came on a horrid paleness, a voracious canine appetite, and, notwithstanding, a remarkable wasting of flesh, which ended in death. When the body was opened, there was found in the stomach a numerous colony of large *lice* bred there.

Another sort of animals recommended in a jaundice are the *earth-worms*. The virtue of these too was supposed to lie in their salts. They were reckoned so famous a remedy both in this and other diseases, that we had a compound water
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* Act. medic. Hafniens. tom. III. Obs. 91.

in the shops, in which they were an ingredient, called *aqua lumbricorum magistralis*, in great request with some people not many years ago. And Hoffman mentions them in his cure of biliary calculi. He says, that as Avicenna's remedy * was always in high esteem with the ancient physicians in a chronical jaundice, so it may doubtless have place in such ob-

* Galen indeed, many centuries before Avicenna, speaks of earth-worms as a cure for the jaundice. But he proposes them to be used in a different way, that is bruised, and taken in water and honey: by which, he says, the patient being purged is presently cured.

τὸ γῆς ἔντερον ——— ἐν δὲ τίς αὐτὰ τρίβων ἐν μελικράτῳ λάβοι
ἐκλεριῶν εὐθέως καθαρθεὶς απαλλάσσεται.

GALEN. de Theriaca ad Pison. cap. 9.

A strange and nauseous purge! And might one not also expect it very likely to prove emetic? But Galen seems to speak of this medicine by hearsay, in a traditional way, as he does of many others in that same chapter. So he says in the very preceding words, that these same worms taken in wine dissolve the stone in the urinary bladder. And whosoever attends to all the strange absurd things, that he there says about the use of different parts of various animals, will not, I believe, reckon what he says about earth-worms for the cure of the jaundice to be a very authentic commendation.

obstructions of the ducts, as hinder the course of the bile. This remedy was dried *earth-worms*, either in the form of powder with wine and sugar, or made into pills, given over night, and the next morning the patient was to drink *whey*, made of the milk of goats fed with the aperient kinds of herbs. We are not, indeed, told the dose, either of the *worms* or *whey*, nor how long they were to be continued. However, if I could be prevailed upon to prescribe this method, and my patient would use *whey* freely, I think, I should be very little solicitous about the dose of the *worms*. The college has omitted them in their last catalogue, and, I believe, few people, if any, think the materia medica deficient on that account. But having said more than enough on this article, and chusing to pass by other things of a like nature, I proceed to speak of some medicines much more worthy of notice.

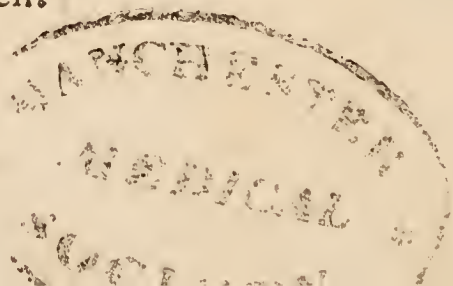
And here, *mercury*, and some its preparations, may deserve to be considered.

I have

I have before mentioned *calomel*, as an ingredient sometimes proper to be mixed with purges. *Æthiops mineral* is by some commended as a deobstruent, and a most useful medicine in obstinate jaundices ; while others think it has little or no virtue. Boerhaave, in particular, says of it in his chemistry, that it only passes through the body as an inert mass, and cannot enter the lacteals or any way get into the blood ; and others, on the contrary, reckon it very penetrating, and capable of pervading the whole body, even to the very minute capillary vessels. Who can reconcile these opposite opinions ? One perhaps may make it too inactive, while others, ascribe more efficacy to it than it ordinarily discovers. Some may wonder, that I should mention it at all as a medicine in this case, especially as I have expressed some doubts about the common use of *millepedæ* ; and others may perhaps think, that I do not say enough in praise of it. And probably, we all of us have our prejudices for and against some particular medicines.

However, I have often given * *Æthiops mineral* in these cases, as well as others; not alone indeed, but joined with other ingredients, in the manner I shall afterwards mention, and have at least found it innocent, and that in the use of the method my patients have grown well. How far *Mercury*, in a more active form may be proper to attenuate the viscid humours in this case, and to help towards expelling these calculi, I cannot say with any certainty. I have sometimes given it crude, five or six grains at a dose, dissolved with *Venice turpentine*, and mixed with other ingredients, particularly *rhubarb*, or some other purgative to open the body, and it has at least had no ill effect. Hoffman condemns *mercury* in general in a jaundice, for fear of a salivation

* That most people can take *æthiops mineral* in very large quantities without inconvenience, and often without any very sensible effect, is well known. But that in some few very rare instances, when there is some great peculiarity of constitution, it may even bring on a salivation, I am well persuaded; having heard one example of it, at least, from such authority, that I can no more doubt of the truth of it, than if I had seen it myself.



tion and other ill consequences. He says he has known a few grains of *calomel* affect the mouth, and disorder the patient in other respects. I have also, more than once, known the mouth affected by a few grains of *crude mercury*, although it was joined with purgatives so as to keep the body open; and have been ready to suspect, that this is more likely to happen in liver cases than in others. But as we know the like happens to other patients, who have no tendency to a jaundice, nor signs of any disorder in the liver, there is no conclusion to be drawn from a few instances, that this medicine has such an effect oftener upon icteric patients than others. Nevertheless, I must own, I should be very cautious about *mercury*, especially in any of its more active forms, in long continued jaundices, where the blood has been loaded with bile for a great while; for fear of dissolving the blood yet more, and bringing on, not only a salivation, but even much worse consequences, such as hæmorrhages, hectic, dropsy, &c. and yet

yet I should not be affraid to join *calomel* with a purging dose in a recent jaundice, and in a proper constitution, as an additional stimulus both to clear away viscidities from the primæ viæ, and to unload the whole intestinal tube of all its sluggish contents. Dr. Frewin is of a different opinion from Hoffman, and approves of *mercury* in the case of biliary calculi, though indeed he only gave *mercurius alcalisatus* to that patient, and of that medicine but one dose so far as appears.

Some of the *gums* are also recommended in icteric cases, particularly the *ammoniacum*. This is reckoned to attenuate viscid humours, and for that reason, and as it also tends to open the body, may probably be an useful medicine in our case; and I have sometimes used it. *Myrrh* also might perhaps be used with pretty nearly the like intentions. It should seem that either of them may properly enough be joined with *soap*, and may perhaps increase its efficacy.

With

With almost all solid attenuating medicines of this sort, a julep *e sal. absinth. cum succ. limon.* &c. seems to me to be proper, as an aperient vehicle, and a corrector of the bile when it is diffused through the mass of blood: to which julep the *sal c. c.* may sometimes be added.

Sometimes a bitter infusion seems proper to mend the appetite, either with or without *elixir vitrioli* according to circumstances.

Another medicine esteemed by some, as a penetrating aperient and detergent, in obstructions of the liver, as well as of the kidneys and lungs, is *balsamum copaiba*. Fuller, in his *Pharmacopæia extemporanea*, tells of a man's voiding biliary calculi, after having taken this medicine made up in that form which he calls his *mistura balsamica nephritica*. Whether the discharge of them was properly imputed to the medicine does not, indeed, so clearly appear; as it should seem from the short imperfect narrative we have of the case, that

that the calculi were actually making their way through the duct at the time the doctor prescribed. But the cure, if it was one, was probably accidental; the doctor was surprized, and does not seem to have thought of any such thing, but to have taken the case to be partly nephritic, as indeed it was, and partly a violent colic. Many such accidental, or seeming cures have happened; where biliary calculi have been unexpectedly discharged, after taking various kinds of medicines, designed for other purposes; as they have also been, by the sole efforts of nature, without taking any medicine at all. So that we cannot conclude, especially from a single instance, that any thing is a good medicine for these calculi, merely because after taking it they have sometimes been seen to come away. However, as the *balsamum copaiba* was taken freely by this patient, it might possibly help to promote the expulsion, by its stimulus on the primæ viæ, in a manner somewhat like the operation of a purge. Or if it excited, or increased vomitings, which

which, though we are not told that it did so, would be no strange effect of such a medicine in the circumstances of that patient, it might also in that way forward the passing of the calculi. And it is possible likewise, that this medicine, being taken more gradually, and continued for a considerable time, may be capable of operating in another way, by its detergent quality, both towards removing and preventing obstructions in the biliary passages.

To all the remedies before mentioned I must add one more, namely exercise; which is a thing of very great importance, as well in this, as in many other chronic diseases. With regard to biliary concretions, exercise is, in some circumstances, capable of promoting, or even of procuring their discharge. And it is certainly of great use to prevent the breeding of more, as it strengthens all the organs of the body, and assists them in performing their several functions, helps the appetite and digestion, promotes a regular circulation

tion, and due secretions and excretions, keeps the blood and all the fluids of the body in proper order, and so prevents that stagnation and degeneracy of the bile, often brought on by an inactive life, which occasion the formation of calculi. Sydenham very justly lays a great stress upon riding on horseback in almost all chronic diseases. Nay he goes further and says, that in a consumption, it is almost as much a specific, as the *bark* in intermitting fevers. A strong expression! Which he could only mean to apply to such cases where the lungs were not much decayed. Its effects on the viscera of the abdomen cannot be less than on those of the thorax, since the former are yet more shaken by it than the latter. By the agitation of the body in riding each particular viscus is assisted in performing its proper office. The slow motion of the blood, returning from the other viscera of the abdomen to the liver, is quickened in its progress to the vena portarum, and through all its ramifications in the liver; by which, and by the shaking of that
bowel

bowel itself, the secretion of the bile is promoted, and also its excretion through the ducts into the duodenum. In consequence of this, and of increasing the tone of the fibres of all the viscera, the chyle is made more perfect, finds a more ready entrance into the mouths of the lacteals, and also a more free passage, through all their meanders in the mesentery, to the thoracic duct, and so to the blood, for the proper nourishment of the body. The weak action of the lymphatics is strengthened. The guts are better enabled to propel, and to discharge the fæces; by which costiveness, so common and so hurtful to many sedentary persons, is in some measure prevented. The urinary organs also are assisted in secreting and expelling the urine. Of so great service to the health of the body is the shaking the viscera abdominalia only (for I shall not digress so far as to attempt to shew its full effects on the whole animal œconomy) by the motion of riding on horseback. The exercise of a coach, or other carriage, is also very

useful to such as cannot ride on horse-back ; and is most healthful on roads that are somewhat rough, or paved with stones ; and in carriages not made too easy by hanging on exquisite springs. This contrivance of many springs is a piece of indulgence only fit for those, who, from weakness or some particular disorder, are not able to bear a stronger motion ; or for such as are obliged to travel a great deal, and would be too much fatigued without such helps, (for exercise may be too much as well as too little) and who at the same time have as much exercise in that gentle way as their health requires ; but is not at all proper for those who travel but little, and that merely for health, and are able to bear a stronger motion. There is yet another kind of exercise, by which the whole body is moved, very proper for those who can neither ride on horse back, nor have a coach ; I mean that of the chamber-horse, as it is called. These machines may be of various kinds. But, of those I have yet seen, I like that sort best, which
has

has an armed chair fixed on the middle of a long board or plank, of a due strength and elasticity, raised to a proper height from the ground upon trestles supporting each end of the plank, with a proper footstool fastened to the chair. On such a seat, by a little easy action of the feet and hands, (especially if there is a rope fastened to the cieling of the room to pull by) and the reaction and play of the springing board, the whole body receives a very considerable and effectual motion. This kind of exercise is easy to be had by all sorts of people, by many who cannot have either a coach or a horse. And it has one advantage over both the others, that it can be used at all hours and in any weather. If such a simple machine was more commonly used by studious sedentary people, and by women that live an inactive life, and whose family affairs will not allow them to travel much; I make no doubt, but they would find the benefit of it in their health, and that, among other advantages, it would be one means to preserve them from biliary con-

cretions, to which the want of exercise so much disposes them. But many people are apt to despise such advice, looking upon it as a trifle, as they also do rubbing, whether with flannels or the flesh-brush; (though Boerhaave was so fond of it that he seems rarely to have given direction in a chronic case without making rubbing a part of his prescription) because they are not aware, that from some of these gymnastic methods, properly applied, more good may be expected in some disorders, than from the most pompous parade of medicines. And if studious people, especially those who are not of a very strong make, would allow themselves a proper share of time for exercise, either on horseback, or in such way as suits them best, and make proper observations on themselves, they would often be sensible of a very beneficial alteration, in the activity and vigour both of body and mind, and also find, that the time they so employ is not lost as to their studies: since by the recruit they would gain, they would be able to pursue them
more

more closely, and perhaps too with clearer ideas, after some intermission and diversion, than when they have been poring too long on the same subject. Many also would enjoy longer life, and better health.

But to come more directly to our subject. I have said, that in some circumstances exercise is capable of promoting the discharge of biliary concretions. This will readily be granted, when the concretions are very small, not much larger perhaps than grains of coarse sand, and lie loose in the bladder or ducts. In that case they may probably pass off insensibly with the bile, pretty much like gravel in the kidneys along with the urine. Those also of a larger size are often shaken out of the bladder into the duct by exercise, as we know by a fit coming on after riding, or after some sudden and violent motion, in like manner as a stone is forced from the kidney into the ureter. Which fit lasts a longer or shorter time, according to the size, shape, and position of the

calculus, to the previous distention, or dilatability of the duct, and other circumstances. For when the duct has been much dilated by the passing of former calculi, exercise may help to bring away others with little or no pain. It may also help to separate those calculi, that but slightly adhere to one another, of which we have spoken before; and by reducing the cluster into single stones, they may become fit to pass the duct, which was impossible while they were joined together like one solid large stone. This union is not, I think, taken notice of by Van Swieten; but he supposes, that, by the motion of the stones in the bladder, and rubbing one against another, they may be made less, and so disposed to come away the more easily; or that, at least, they may be hindered from growing bigger. He therefore proposes, besides the general motion of the whole body by riding, &c. that the right hypochondrium, just in that part where the gall-bladder lies, should be rubbed and shaken with the palm of the hand many times in a day,

day. This may be well worth trying, and may possibly help to break and reduce into powder, some very friable sandy stones, that are newly and slightly cemented, and not yet covered with the crust. For I should suspect, that even the softest and lightest of them, when once covered with that crust, cannot well be broken in the bladder by any rubbing which the patient could bear, notwithstanding they are so easily crushed by a finger when they are out of the bladder. And this rubbing may perhaps help to separate such clusters as do but slightly adhere together, so as to reduce them into single stones; as also, at other times, may prevent the stones from ever being formed into clusters.

The time and manner and degree of exercise, with a view to dislodge and expel these calculi, must depend upon the circumstances of the case and patient, and can hardly be laid down by any definitive rules. It is evident, however, that it cannot be advised in the time of a violent

lent fit, any more than to a woman in labour, or to a patient on the rack from a stone fixed in the ureter. But the time for using it must be when the patient is at ease, or at least in no violent pain. Nor even then will many patients have the resolution to persevere in it, if they find that it brings on fresh fits; which it must do, if it brings fresh calculi into the duct of such a size as cannot readily pass. It is certain that all patients cannot bear motion alike, both on account of the difference of constitutions, and of the different circumstances of the calculi. Those of a phlegmatic constitution, with lax fibres, can, *cæteris paribus*, bear it best, and to these such a degree of motion may be tolerable, and beneficial, which to others, of a sanguine constitution, and rigid fibres, might occasion the greatest mischief, such as a fixed immovable obstruction of the duct, a fever, inflammation, or even, in consequence of these, a mortification. Therefore exercise is not to be prescribed in this case without due caution and proper distinctions;

tions ; and much less is a perseverance in it to be absolutely insisted on at all events. Those who are able to bear it, and find it effectual in bringing away calculi, would do well to use it as much as they can. But when its effects are only to bring on, or to aggravate, fruitless pain, and much more, when still worse consequences are reasonably to be apprehended from it ; such patients should doubtless lay it aside, and adhere to such other means as can be used with safety ; in like manner as I said before about the use of forcing medicines in the case of large calculi ; and as patients afflicted with the stone in the kidneys are obliged to do, when motion occasions intolerable pain, bloody urine, &c. and at the same time is of no advantage towards the discharge of the stones. Dr. Musgrave, in the *Philosophical Transactions**, tells a remarkable case, which I have referred to before on another occasion, of a gentleman's voiding a large biliary calculus ; the expulsion of which the doctor ascribes to travelling a long journey to Bath in a coach. We are

* Motte's Abridg. Part. II. p. 404.

told, that the gentleman had a jaundice, which came on of a sudden, had lasted several months, and was attended with pain; that the pain had been constant during the whole journey; and that the calculus was voided in so little time after the patient came to Bath, that its expulsion could be imputed to nothing but the motion of the coach. But we are not informed very particularly about this patient, of his age, or constitution, whether he had ever been troubled with a jaundice, or voided any calculi before, what remedies had been used, or what symptoms intervened between his arriving at the end of the journey and his passing of the calculus. It should seem from what we know of this case, that the stone had been a long time in the duct, or pressing against the mouth of it, perhaps from the first sudden appearance of the jaundice, stretching the fibres of the duct and making its way gradually, and so with the less degree of pain; and also that the duct had been before dilated by the passing of former stones. And indeed,

deed, without the last of these suppositions, it is not easy to conceive, that the mere motion of the coach could force a stone of that size out of the bladder and through the duct; or that it could ever have made its way with so small a degree of pain as the patient could bear to travel with. However, we ought not, from this single instance, to be over hasty in advising violent exercise to patients of this sort, or much less in concluding that it is the only remedy; especially as other patients have voided as large or larger stones without exercise. Into both which mistakes Dr. Musgrave's words, together with the assertion of Riverius which he quotes, "that a jaundice from calculi is incurable," (meaning I suppose by medicines) might possibly lead some of his readers. In short, the advantage of exercise is much more evident towards preventing the formation of biliary concretions, and removing the disposition to breed more, when they have been cleared away, than it is for discharging them if they are of a large size. And when persons

sons have got rid of any large ones by this means, such cures have perhaps more commonly been accidental, as that of the gentleman above mentioned seems to have been, than the proper result of intention and advice; in like manner as a stone, which had been fixed in the ureter for some time, has been known to be pushed through into the bladder by a fit of vomiting, or by a sudden violent jolt of a coach*.

There is yet one other method of bringing away these calculi, which if it was generally practicable, would be of all the most effectual and certain, especially for large ones; and that is by making an incision into the bladder and extracting them. This operation is mentioned by Monsieur Petit †, as a thing that may be done with safety under one circumstance, and only one; which is, when there is an adhesion of the distended gall-bladder to the peritonæum. For

* Carol. Piso de Proluv. serof. Observ. CII. & CXI.

† Memoir. de l'Acad. de Chirurg.

where

where there is no such adhesion, opening the gall-bladder must cause the bile to flow into the cavity of the abdomen, and have a fatal event. In like manner it is well known, that the opening of an abscess in the liver can only succeed well, when there has been also an inflammation of the peritonæum, to cause an adhesion of it to the liver; for without that, the purulent discharge must have vent into the cavity, and inevitably destroy the patient. Our author was led to this observation, of the possibility of extracting gall-stones in this manner, by cases that occurred to him in practice; by seeing these stones voided along with the pus from abscesses of the liver and gall-bladder, communicating with the peritonæum and external teguments, and making their way outwards; by tracing fistulous ulcers of these parts and laying upon their sinuses; and by finding these adhesions in opening bodies that had laboured under such disorders, as well of those patients who had died of them, as of others who had recovered from them, and afterwards died of other diseases.

diseases. But I have not yet heard, that this operation has ever been performed merely to extract stones, when there was no abscess or ulcer to be opened or dilated. Nor ought it ever to be attempted without that judgment and caution, which Monsieur Petit recommends, in observing the signs of adhesion there mentioned by him, and being sure, as he says, both of the stones and of the adhesion; since, if there are no stones the operation is needless, and if there is no adhesion the consequences must be fatal. An adhesion between two or more internal parts is commonly the effect of a previous inflammation, and happens in many parts of the body, though perhaps no where so often as between the lungs and pleura. We may easily conceive of the manner of it from what we see in the external parts. Thus we find that the glans penis and præputium will come to adhere strongly together, so as to need the assistance of surgery to separate them, from an inflammation of these parts; as happens sometimes in the small pox, or from some o-

ther recent cause, when there was no preceding ulceration, either of a venereal or any other kind. If two fingers or toes, that had been inflamed and were now suppurated, or if they were only excoriated, should be confined in close contact, we know that they would adhere and grow together. And in the internal parts nature makes use of adhesions, inflammations, and suppurations, to procure a safe passage for the expulsion of noxious things contained there, whether formed within the body, or received into it from without. In this manner not only biliary concretions have sometimes been discharged as abovesaid, but even stones in the kidneys have made their way, through the substance of the kidney, through all the membranes, muscles, and teguments, till they have worked out at an abscess or an ulcer in the † loins. In great obstructions of the intestinal tube, when a part of the gut has been inflamed and adhered to the peritonæum, nature has sometimes relieved herself by a suppuration extending to the muscles and teguments;

† Tulp. Observat. lib. 4. cap. 28.

which making its way outwards has formed a new vent for the *fæces alvinæ*, and thereby saved the patient's life. In which case, if there was not a proper adhesion of the gut to the peritonæum, a part, at least, of the *fæces* must fall into the cavity of the abdomen, and quickly destroy the patient.

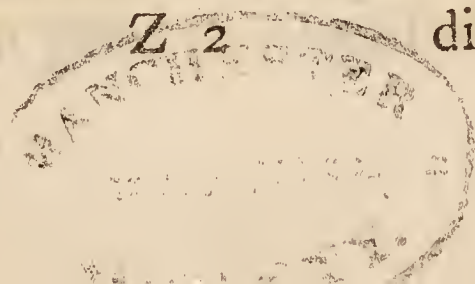
But these are methods taken by nature, which art cannot imitate; nor can it ordinarily afford any assistance in such cases, till nature has prepared and pointed out the way. Thus, though we may open an abscess in the loins, which takes its rise from the kidney, and contains stones thrust out from thence; yet how rash and desperate must be the attempt, to cut through to the kidneys, when all the intermediate parts are sound, with a view to extract stones from thence, in imitation of nature's having expelled them this way? We have indeed one or two instances upon record*, where this operation of nephrotomy is said to have been performed with success. But the cases seem

to

* See *Philos. Transact. Lowthorp's Abridg.* vol. III. p. 188. *Freind's Hist. of Physic*, vol. II. p. 185.

to be not satisfactorily related in all their circumstances. Which if we were duly informed of, we might perhaps have reason to think, that nature had prepared the way for the success of the operation, by forming an adhesion of the kidney to the peritonæum, and of this to the muscles; as also that a suppuration was begun, and that the stones were even advanced a part of the way to meet the knife. At least, I think, it may be said, that as those two cases are told, they are not of sufficient authority, either to encourage or justify any man to undertake the operation.

I shall now conclude with a short recapitulation of the cure, and a recital of the method I usually follow. Which indeed I vary according to circumstances, always endeavouring, so far as I am able, to adapt it to particular patients, in which the true art of prescribing consists; since the best method, in any disease, and the most useful medicines, if not rightly applied, may not only do no good, but may even do very great mischief; and a medicine



dicine which is generally good for this or that disease, may, for some particular reason, not be proper for this or that patient.

First then, I order bleeding, if I find indications for it, according to the doctrine laid down under that head; otherwise I omit it. I use vomits and purges according to the rules proposed under those articles. I like to keep the body always open, with stools rather lax than solid, either one or two or more in a day, according to the constitution and circumstances of the patient. I prescribe clysters, fomentations, or a warm bath, when I find occasion for them. I give *opium* as the exigency of the case requires, before vomits and purges, and after them, and at any time during the fit, when the pain is insupportable without it. If there is sickness at the stomach, and retchings to vomit, which want to be checked, I give a pleasant generous julep, somewhat like what Fuller calls his *julap. antemet.* or at least in the like proportions of *sal. absinth.* and *tinct. Thebaic.* but made more simple, by using no other water but
aq.

aq. font. and *aq. alexet. spirituos.* or *menth. vulg. spirit.* Such a julep will often stay on a sick stomach, when one made with the usual doses of *sal. absinth.* and *succ. limon.* will not, even if it has the same quantity of the *tinct. Thebaic.* in it. On the days free from vomits and purges, I mean after the fit is pretty well gone off, and the patient's stomach is able to bear them, I order alteratives of different kinds according to circumstances. I often give twice in a day, *sapon. Castil. vel amygdalin. æthiop. miner. āā ʒß vel usque ad ʒj.* with a few grains of *croc.* or *spec. aromat.* or both; and wash them down with a julep *e sal. absinth. succ. limon. &c.* in the usual proportions; which julep I likewise order to be taken twice in a day by itself. Sometimes I add to the *sapo, &c. tart. vitriol.* from ʒß or less to ʒj or more, especially if the body is not sufficiently open without it, or if I give those solid medicines without the julep. And sometimes I add also *gum. ammon. or myrrh.* Sometimes I give pills *e sapon. cum rhei vel aloes ʒ. q.* or with *gum. ammon.* also. And to some patients I have given every night, or sometimes perhaps in the morning too, pills

ex argent. viv. gr. v. cum terebinth. vel balsam. copaib. exactissime subact. gum ammon. ʒss vel gr. xv. pulv. rhei vel pil Ruf. vele colocynthid. cum aloe q.s. ad alvum satis laxandam, ne particulæ mercuriales ad glandulas salivales ruant. This medicine seems to be likely to attenuate viscid humours, but I have not used it often enough to be clear about its effects in this case; and I would by no means give it to all patients, for the reasons before mentioned, when speaking of this kind of medicines.

Sometimes I order a bitter infusion to help the appetite and digestion, to which I often add a little *sal. absinth.* and either give *elixir vitriol.* along with the infusion, or not, as I judge most proper for the patient.

For common * drink in the fit I advise *barley-water*, or water gruel, with
malloze

* Whether the difference of waters, hard or soft, is necessary to be observed in preparing the common drink of these patients, or whether some kinds of hard water can have any bad effects with regard to gallstones, as they are suspected to have with regard to the urinary calculus, and as the hard water of some
parti-

mallow or *marsh-mallow* roots boiled in them, or any other soft smooth liquor, as *linseed* tea, or rather an emulsion made of those seeds, or an emulsion of *sweet almonds*, with a little white wine added to any of these liquors. And sometimes between the draughts of these a solution of *spermaceti* may be given, or to such as can bear oil, *ol. amygd. dulc.* either by itself, or mixed with *syr. ex alth.* or the like. When the fit is off, and the stomach can bear a quantity of drink, I would give *barley-water* with some of the *opening roots* and herbs beforementioned boiled in it, if the patient will drink it freely so prepared; or I sometimes propose common *whey* for such patients as like it, and can bear to take it plentifully. At proper times, but especially when we have reason to hope that the fits are all over, and that the bladder is clear of stones for the present, *Tunbridge* or *Spaa*, or some other *chalybeate water* may be of great service. To those who are not able to go to any

particular places has been observed to have in producing colics in some constitutions, may, perhaps, be worthy of consideration, but is more than I can take upon me to assert.

of these springs, I advise *Spaa* or *Pyr-
mont-water* at home. And to such as
cannot drink these in any quantity, or
to poor people who cannot bear the
expence of them, I sometimes give *steel*
in some other form, to strengthen
and mend the constitution, in order to
prevent any further stagnation of the bile,
and the concretion of new stones. With
the like intention I recommend exercise,
as the patient is able to bear it, and ad-
vise that he should persevere in it when
he is quite well, in order to continue so.
And with a view to keep the biliary
passages clear, so as either to prevent the
formation of more stones, or to expel
them while they are recent and small, and
have not yet discovered themselves by any
ill effects, I would advise, if there was no-
thing to forbid, that a vomit should be
given once in a while, in a month sup-
pose, or six weeks, or two months, for
a year perhaps, or more; and a purge at
a proper distance from the vomit, or
whenever there should be occasion; and
that at all times due care should be taken
to guard against costiveness.

But

But in long obstinate cases, or where we suspect large stones, and have but small hope of a cure, I would use Van Swieten's method of aperients, &c. as far as should appear suitable to the case and constitution, and the patient would comply with it, to try what favourable change time and perseverance can produce. During which course, perhaps also the use of *Bath-water*, both for drinking and bathing, may sometimes very properly intervene. And as to the rest, we must endeavour to palliate the symptoms as well as we can, according to the indications; and to stave off the consequences of dropsy, &c. by helping the appetite and digestion; and promoting the secretions and excretions as far as we are able; always remembering those rules, which have been justly called fundamental ones in physic, and which are very plain rules of common sense; namely, that it is better to do too little than too much, and that in all cases where we can do no good, we ought to take all possible care that we do no harm.

EXPLANATION
OF THE
FIGURES.

T A B. I.

The gall-bladder and its ducts together
with a portion of the duodenum dried.

FIG. I.

A The gall-bladder.

G An opening to shew a stone lodged
in its neck.

B The cystic duct.

C Part of the hepatic duct.

D The opening of the hepatic into the
common duct, to shew which the
part is cut open for a little way.

E The common duct.

h The pancreatic duct with a crow-quill
thrust into it, which passes into the
duodenum.

H Part of the duodenum cut open.

F The common orifice of the biliary and
pancreatic ducts opening into the
duodenum.

FIG.

Explanation of the Figures.

F I G. 2.

The front view of the part D fig. 1. cut open to shew the opening of the hepatic and cystic ducts into the common.

a Part of the hepatic duct.

b Part of the cystic.

d A sort of partition which begins at the angle formed by the meeting of the hepatic and cystic ducts, and runs a little way betwixt the two.

e The ending of this partition, from which begins the common duct represented at letter c.

N. B. The spiral shape of the cystic duct is owing to the contraction of the valves by drying.

T A B. II.

This plate is taken from Reverhostius's *Dissertatio anatomico-medica de motu bilis circulari ejusque morbis*: where he tells of four examples of biliary calculi found by dissections, and gives a representation of them by these figures, which I thought might convey some ideas to such readers as are unacquainted with the subject.

F I G.

Explanation of the Figures.

F I G. 1.

Represents some of the ramifications of the porus bilarius obstructed and distended here and there with calculous concretions.

A. A. A. A. A. A. A. The branches of the porus bilarius.

B. B. B. B. B. B. The parts enlarged.

C. C. C. C. C. C. The coats of the porus cut and laid open.

D. D. D. D. D. D. The calculous incrustations.

E. The ductus communis choledochus.

F. The cystic duct.

F I G. 2.

Shews the shape and size of eight calculi taken out of the gall-bladder of a woman thirty years old, which our author compares, and not without some reason, with the eight little bones of the wrist.

F I G. 3.

Gives a faint resemblance of a large parcel of calculi, of which there were in all 140 taken out of the gall-bladder of an old man of eighty, of various shapes

Explanation of the Figures:

shapes and sizes, some of them whole, some broken or cut asunder, so as to shew the appearance of their inside.

F I G. 4.

Represents the gall-bladder of a young woman, aged twenty-four, distended with bile, and having its neck entirely stopped by one round stone, which is here shewn of its proper size, and having its surface rough with small granulated incrustations.

- A. A. The gall-bladder.
- B. The neck of the bladder,
- C. The stone stopping up the neck.
- d. The part where the valves are contained.
- E. Part of the bladder separated and hanging down, that the stone may be seen.
- F. The winding shape of the cystic duct.
- G. The hepatic duct.
- H. The common duct.

F I N I S.

E R R A T A.

- Page 4. lin. 18. for *fail*, read *faïls*
P. 6. lin. 18. for *enquiry*, r. *inquiry*
P. 10. lin. 1. and wherever else it occurs, for *schirrus*, r. *scirrhus*
P. 11. lin. 11. for *a of*, r. *of a*
P. 12. lin. 20. for *judgement*, r. *judgment*
P. 19. lin. 8. for *carry'd*, r. *carried*
P. 20. lin. 16. after *function*, add *of*
P. 31. lin. penult. for *kidneys*, r. *kidnies*
P. 43. lin. ult. dele *part*
P. 45. lin. 10. for *Simpson*, r. *Simson*
P. 51. lin. 13. for *biliarius*, r. *bilarius*
P. 52. lin. 24. for *just about*, r. *just at*
P. 53. lin. 10, and p. 54. lin. 2. for *alcali*, r. *alkaline*
P. 56. lin. 20. for *jejunium*, r. *jejunum*
P. 72. lin. 4. for *sometime*, r. *sometimes*
P. 108. lin. 7. for *encrusted*, r. *incrusted*
P. 118. in note. after ‡ page add 89.
P. 137. lin. 7. for *for fæces*, r. *fæces*
P. 151. lin. 23. for *kidnies*, r. *kidney*
P. 171. lin. 17. for *Moreover*, r. *Moreover*
P. 208. lin. 5. for *ptbifis*, r. *phthifis*
P. 210. lin. ult. for *wirhout*, r. *without*
P. 216. lin. 11. dele *same*
P. 224. in the note, lin. ult. for *acalcul*, r. *a Calcul*
P. 255. in the note, lin. ult. for XLVI. r. XLVII.
P. 258. lin. 19. for *immoveably*, r. *immovably*
P. 270. lin. 20. for *along*, r. *a long*
P. 272. lin. 11. for *dilation*, r. *dilatation*
P. 295. lin. 15. for *polychraftum*, r. *polychrestum*
P. 297. lin. 8. for *tho'*, r. *though*
P. 299. lin. 6. for *query'd*, r. *queried*.

Any other Errata which may have been overlooked, as also what occur in the pointing, the reader is desired to correct.

Fig. 2.

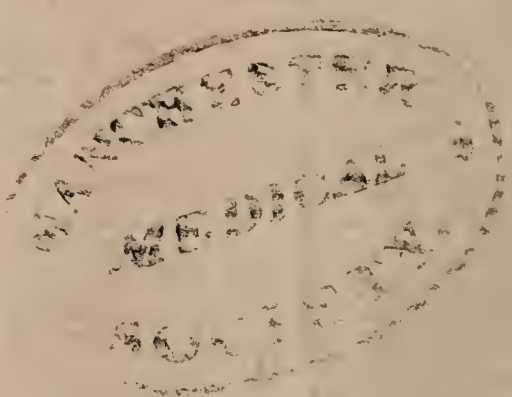
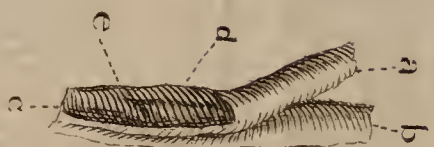


Fig. 1.

